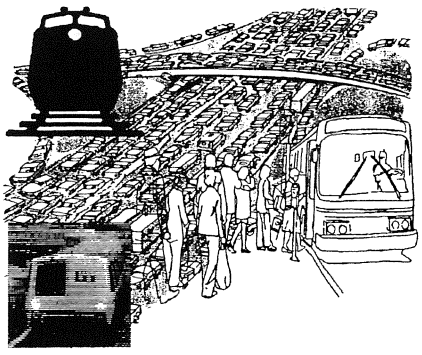
Chapter 6

Roads



VI. ROADS

A. BACKGROUND

Residents of San Mateo County and surrounding areas depend heavily on the County's road system for daily transportation to commercial, educational and recreational destinations. This system, along with the relative affordability of automobile travel, allows most residents to live in peripheral, low-density communities while still enjoying easy access to employment and urban amenities. However, as prevailing development patterns encourage workers to live even farther from established employment centers, and regional population growth outpaces transportation improvements, congestion on County roadways is rising to critical levels.

This section explains some of the trends that have contributed to increased congestion, describes the road network and the agencies responsible, documents existing and projected conditions, and outlines the most important approaches to congestion relief.

1. Regional Context and Demographic Trends

Ever since its formation in 1855, San Mateo County has been an attractive place of residence for those who work in San Francisco and, more recently, Santa Clara County. Stage lines and railroads allowed early residents to enjoy the charms of country living, and a more favorable climate, without sacrificing quick, reliable access to city jobs. Transportation was therefore vital to the County's development as a string of bedroom communities with relatively little industry or commerce.

After World War II, the County's population boomed as agriculture gave way to large housing developments designed for the automobile. Construction of the County's freeway system in the 1950s and 1960s reinforced the commute patterns established during the previous century, although the County's low land prices and good freeway access began to attract major employers. Santa Clara County, however, gained the lion's share of new suburban industry.

During the 1990s, as Santa Clara County has become virtually built out and its prices rise, employers, especially in the high-tech manufacturing sector, have increasingly chosen to locate in San Mateo County. Yet even with the steady

increase in jobs, the County has retained its historically high level of out-commuting. The Metropolitan Transportation Commission estimates that in 2000, about 38 percent of employed County residents travel to other counties for work. This percentage is much higher than other counties, such as San Francisco with 20 percent and Santa Clara with 9 percent (MTC, 1998).

While the County has the potential to add thousands of new jobs, there remains little land available for residential development. Because of the tax revenues that commercial and industrial development generate, and the high cost of providing services to residential areas, local jurisdictions have little incentive to rezone large parcels for affordable housing development. This means that most new County workers cannot afford to live in the County at the standard they desire, and they choose instead to make long trips from more affordable areas such as Alameda County.

In conclusion, congestion has worsened in the past five years primarily because County residents are increasingly sharing the road system with commuters from surrounding counties. From 1990 to 2000, the number of jobs in San Mateo County will have increased by 16.6 percent, while the number of households will have grown by just 4.9 percent (ABAG, 1997). During the same period, work trips from the other Bay Area counties will have risen by 19.7 percent (MTC, 1998). This trend toward more in-commuting, combined with consistently high out-commuting, means more vehicles must share limited roadway capacity.

2. ***Description of Roadway Network***

Several government agencies are responsible for the maintenance and improvement of the County's 2,000 miles of public roads. The California Department of Transportation (CalTrans) manages those roadways that are part of the State Highway System. These include Interstates 280 and 380, U.S. Route 101, and State Routes 1, 35, 82 (El Camino Real), 84, 92, 109 (University Avenue, Kavanaugh to State Route 84) and 114 (Willow Road). These highways, while making up just 209 miles of the County's road network, carry a much greater volume of traffic than other roads, and serve a vital function in the Bay Area's transportation network. For the purposes of planning and analysis, the *Countywide Transportation Plan* defines all of the routes in the State Highway System, with the exception of State Route 35, as corridors of regional significance (see Exhibit 6.1).

In addition to the State Highway System, the Metropolitan Transportation Commission (MTC) includes important local arterial roads as part of the Metropolitan Transportation System (MTS). These roads connect residential and commercial areas to the State highways.

Another important element of the roadway network is local arterials and streets. For the vast majority of commuters, the trip to work starts here. These streets are designed to accommodate only the traffic generated by immediate surrounding activities. Responsibility for maintenance and improvement lies with individual cities and, for unincorporated areas, with the County.

3. Existing Conditions

a. Corridors of Regional Significance

Due to the trends described above, congestion on San Mateo County's roads has worsened considerably over the past five years. Between 1993 and 1998, daily vehicle hours of delay on County freeways increased by 600 percent, with an average annual increase of 120 percent. The total length of freeways affected by congestion also increased, from 14 directional miles in 1993 to 33 miles in 1998. One County road, westbound 92 between 1-880 and Foster City Boulevard, was the third most congested freeway in the Bay Area. In addition, commuters experienced delays in locations that were not previously congested, such as northbound 280 between Sand Hill Road and Woodside Road (CalTrans, 1998). See Exhibits 6.2 and 6.3 for a listing of the County's most congested roads in 1999.

b. Local Streets and Roads

The condition of the pavement of local streets and roads in the County is presented by jurisdiction in Exhibit 6.13. The statistics show that overall 64 percent of local streets and roads are in satisfactory to good condition, while 39 percent are in poor to fair condition. The jurisdictions are ranked from top to bottom based on the percentages of streets and roads in each jurisdiction in poor to fair conditions. Exhibit 6.13 shows that the unincorporated County has the highest percentage (62 percent) of roads in poor to fair condition, followed by Daly City at 61 percent.

4. Projected Conditions

Even with the planned roadway and transit improvements outlined in Alternative 6c, congestion in 2010 will exceed current levels. During the PM peak period, average freeway speed will drop to 41 mph (from 48 mph in 1990), while freeway driving times will increase by about 42 percent. See Exhibits 6.2 and 6.3 for a projection of the County's most congested roads in 2010.

5. Improvement Plans and Programs

Government agencies can take three general approaches to congestion relief. They can attempt to accommodate demand for auto travel by increasing roadway capacity; they can try to reduce demand by making auto travel more expensive (i.e., toll roads, gas taxes, paid parking) or by encouraging higher transit use, car pooling, or shorter trips; and they change land use policy to restrict, control, and direct growth. Studies consistently show that policies which increase the cost of auto travel are most effective in reducing congestion over the long run.

At all levels, federal government policies influence the nature of local plans and programs. The most important federal transportation program is the Transportation Efficiency Act for the 21st Century (TEA-21), which emphasizes congestion reduction and linking of transportation planning with land use and air quality policies. TEA-21 is the primary source of federal transportation funding. Federal and State Clean Air Acts also have a significant impact on regional and local transportation planning through programs to reduce pollution-causing auto travel and traffic congestion.

The California Transportation Commission (CTC) develops the State Transportation Improvement Program (STIP) and the Interregional Improvement Program (IIP), four-year programs that distribute limited federal and State funds according to a list of priority improvement projects. The CTC develops this list from various Regional Transportation Improvement Programs (RTIPs) that are submitted by regional transportation planning agencies such as the MTC. In addition to submitting an RTIP, the MTC develops the Regional Transportation Plan (RTP), a document that sets funding priorities for a 20-year period.

At the County level, the Congestion Management Agency (CMA) develops a Congestion Management Plan (CMP) that recommends various improvements and programs to relieve traffic congestion. These include trip-reduction and

travel demand management, land use impact analysis, capital improvement programs, and monitoring of roadway conditions. The CMA for San Mateo County is the City/County Association of Governments (C/CAG), which also prepares the *Countywide Transportation Plan*. Another County agency that deals with congestion relief is the County Transportation Authority, which develops a Transportation Expenditure Plan and a Transportation System Management Plan to administer Measure A funds.

Local land use and transportation planning also influence traffic congestion. As part of their General Plans, the cities of San Mateo County develop land use policies that can have tremendous impacts on regional transportation patterns. For example, if a city zones properties to allow the creation of thousands of new jobs, but does not allow high-density residential development to house the new workers, these policies may significantly worsen congestion by encouraging longer commutes. The lack of coordination of local land use policies with regional transportation planning is therefore a major obstacle to effective congestion relief.

B. ISSUES

1. Defining a Strategy for Improving Roadways

In San Mateo County, physical and fiscal conditions constrain the number of options that can be realistically considered for improving the County's roadway system. The opportunities to build new roadways or widen existing ones are very limited, if at all possible, and they are exceptionally expensive. Water and mountains hem in the urban Bayside. New or expanded roads cannot be built without encroaching on wetlands, mountainous terrain, or intensely developed urban land. And public money for improvements is far from abundant. Even though the County taxes itself to augment State and federal funds for transportation projects, substantial shortfalls for priority roadway and transit projects exist.

These forces need to be recognized to shape a realistic and effective strategy. Logic dictates that if the County in some way reduces the number of existing or projected vehicles traveling on roadways, not as many improvements would be needed. Second, it would be prudent to gain as much capacity out of the existing system by making it as efficient as possible before building new expansions.

Third, it would be wise to avoid deterioration of the existing system by maintaining and rehabilitating it before adding capacity.

2. *Prioritization of Corridors of Regional Significance*

New State and federal legislation allows regional and local agencies to have more influence in selecting and funding roadway improvement projects. It is very important that transportation planning in the County set clear priorities for choosing projects to be funded by State and federal funds so that funds are spent wisely in relieving congestion.

One way of setting clear priorities is to determine first which roadway corridors are currently the most congested or projected to be in 2010. The Travel Demand Forecasting Model provides reliable information about existing and projected congestion by corridor. Once this information is known, specific improvement projects which are in the most congested corridors should be given higher priorities than those in less congested corridors.

Staff determined the relative levels of congestion for each of the corridors of regional significance by measuring two variables: (1) Vehicle Hours of Delay (VHD) and (2) Volume to Capacity Ratios (V/C ratios) or Levels of Service. The higher VHD and V/C ratio the higher the congestion.

VHD measures the total number of hours traveled at peak hours with speeds below 35 miles per hour for at least 15 minutes. On the other hand, V/C ratios measure the volume of traffic (automobiles) on a roadway divided by capacity (number of lanes) at peak hours. Total VHD has been projected for each of the 13 corridors of regional significance, while many V/C ratios have been projected for segments within each of the 13 corridors.

Each of these two measures of congestions has different strengths and weaknesses in illustrating congestion. VHD provides a good measure of total congestion on a corridor, because it measures the total hours of delay that the total number of automobiles experience. However, since VHD is the sum of all hours of delay for the entire corridor, it is a generalized measure which provides no specific information on the exact locations within the corridor where congestion is actually occurring.

V/C ratios, on the other hand, do. V/C ratios indicate the actual flow conditions on many segments within each corridor. Thus, V/C ratios can tell exactly where fast and slow conditions exist. Consequently, they reflect where and how much congestion automobile drivers actually confront.

The VHD and V/C ratio measures for each corridor may seem contradictory at times, but in actuality, the two measures are complementary. Compare corridors Northern 101 and Southern 101. Northern 101 has twice the VHD than Southern 101. Primarily, this is due to the much greater volume of automobiles that travel Northern 101. On the other hand, Southern 101 has a higher number of V/C ratios which indicate highly congested conditions (LOS F) than Northern 101. Primarily, this is because the volume of traffic exceeds the capacity (number of lanes) in many more locations. In other words, the capacity of Northern 101 is better able to accommodate its volume of traffic than Southern 101, even though the volumes on Northern 101 are far much higher.

The CTP considers VHD an overall better measure of congestion than V/C Ratios, because it takes into account the total number of hours all automobiles experience congested conditions. Although Western 92 has the highest V/C ratios in the county, it has one-third the VHD of Northern 101, because of the huge difference in the number of automobiles that travel the two corridors. To put it another way, lesser automobiles face more severe stop and go conditions on Western 92 than on Northern 101, while on Northern 101, three times more automobiles face less severe stop and go conditions than on Western 92.

a. Vehicle Hours of Delay

The model projects that in 2010 the most congested corridor by far will be Northern 101 as expressed in Vehicle Hours of Delay. Historically, this corridor was the most congested in 1990 and, most likely, in all previous decades. Congestion in this corridor will increase by 23 percent from 1990 to 2010, but it will increase by 52 percent if the proposed auxiliary lane projects are not built.

The next most congested corridor, Northern 280, is a far distant second. This is closely followed by Northern 1, Eastern 92, and Southern 101. The most significant increases in congestion from 1990 to 2010 will occur in the Northern 1 and Western 92 corridors. Northern 1 will increase by 197 percent, while Western 92 will increase by 218 percent. These increases

are due to the anticipated levels of new development on the Coastside and the continued pattern of Coastsiders out-commuting to jobs in San Francisco and on the Bayside.

Congestion will be worse in the northern parts of the County rather than the southern. Fifty-three (53) percent of the County's congestion will be north of the 92 Corridors. Twenty-one (21) percent will be on the 92 Corridors, while only 26 percent will be south of the 92 Corridors.

The levels of congestion in the corridors mathematically break into four intervals: (1) Very High, (2) High, (3) Medium, and (4) Low. As policy, it would be wise to plan and program improvements that reduce congestion in the most congested corridors before investment is made in less congested corridors (see Exhibit 6.2).

b. Volume to Capacity Ratios (V/C Ratios) or Levels of Service

Another measure of congestion is Volume to Capacity Ratios (V/C ratios) which can be translated into Levels of Service A through F. A Volume to Capacity Ratio is the volume of traffic on a roadway divided by its capacity. Projected V/C ratios have been calculated for many segments along each of the corridors of regional significance.

The model projects that in 2010 the most congested corridor will be Western 92 as expressed in V/C ratios. The next most congested corridors will be Southern 101 followed by Northern 101, 380, and Eastern 84 (see Exhibit 6.7).

3. Restrict Demand Before Adding of Capacity

Although improvement projects reduce congestion in the short run, it is unlikely that they can permanently relieve congestion in the long run, because adding capacity, which is defined in this plan as building new roadways or new travel lanes, decreases the cost of travel which in turn attracts new drivers. New capacity simply fills up over time.

In order to achieve the most effective solution for relieving congestion, demand reduction strategies must precede projects which increase supply. TDM

strategies which reduce the demand to travel by automobile, such as increasing driving costs, improving transit services, and bringing housing closer to jobs, must be pursued, preferably before expensive capacity increasing projects. The most effective balance between supply and demand strategies must be found.

In addition, there are not many opportunities to increase roadway capacities in San Mateo County. Right-of-way and environmental constraints make it extremely difficult to expand the number of lanes on the County's existing highways and freeways or to build new roads in new right-of-ways.

4. *Priorities for Types of Roadway Improvements*

Again, before expensive capacity expansions occur, the County needs to take advantage of the opportunity to squeeze the most efficiency out of its existing roadways by making operational and safety improvements. These could include improvements such as building auxiliary lanes, adding passing lanes, installing and operationalizing ramp metering, and making interchange improvements. As well, before expensive capacity expansions occur, the County needs to keep its existing system in good condition so that it can function at peak performance.

5. *Roadway Improvements for Northern and Southern 101 Corridors*

a. *Auxiliary Lanes/Interchange Improvements*

The Travel Demand Forecasting Model has shown that the building of auxiliary lanes, in conjunction with necessary interchange improvements, is by far the most effective improvement projects for relieving congestion in the Northern 101 and Southern 101 Corridors. Auxiliary lanes significantly improve the flows of vehicles entering and exiting 101 thereby improving operational efficiencies and adding some overall capacity.

The model also showed that if auxiliary lanes were converted to HOV or mixed-flow lanes, it would cause huge increases of as much as 200 percent in vehicle hours of delay. Travel time would also be significantly increased.

b. Ramp Metering

The model showed that ramp metering increases vehicles hours of delay, sometimes by more than 50 percent; however, ramp metering can reduce overall travel time by as much as 20 percent once a vehicle is traveling directly on the Northern and Southern 101 Corridors. Ramp metering's effectiveness seems to vary. Whether it is a help or a hindrance to relieving congestion depends on the specific conditions of the location. It works well in some locations, but not all. Before ramp metering improvements are operationalized, they need to be carefully tested for impact.

c. High Occupancy Vehicle Lanes

As mentioned before, the Travel Demand Forecasting Model showed that converting existing auxiliary lanes to High Occupancy Vehicle Lanes (HOV) to Northern and Southern 101 Corridors increased congestion considerably. However, if a new HOV lane were built, congestion would decrease, however, not dramatically.

d. Mixed-Flow Lanes

The Travel Demand Forecasting Model also showed that converting existing mixed-flow lanes to HOV lanes also increased congestion considerably. However, if a new mixed-flow lane were built, it would improve congestion more than any other tested alternative. However, there is not enough right-of-way to add a new northbound and southbound mixed-flow lane, and it would be very expensive.

e. Intelligent Transportation Systems

After building auxiliary lanes, making interchange improvements, and installing ramp metering in specific locations where it is effective, the next priority for improvements should be the development of Intelligent Transportation Systems.

Many urban areas are investing in intelligent transportation systems in order to reduce traffic congestion without making expensive capacity improvements. This approach to congestion relief uses an integrated network of detectors, information signs and traffic signals to inform drivers of delays and direct them to appropriate alternate routes. The typical "intelligent highway system" involves three elements: (1) incident detection and management; (2) driver notification; and (3) alternate route signal coordination.

In order to rapidly detect and manage freeway and arterial incidents and heavy congestion, intelligent transportation systems rely on closed-circuit cameras and vehicle sensors positioned strategically throughout the freeway network. These devices allow trouble spots to be pinpointed from a central control center. Once an incident is detected, appropriate emergency personnel are immediately dispatched to the site. Emergency response times are greatly reduced by having roving vehicles patrol the freeway system, allowing them quicker access to accident scenes.

At the same time that emergency personnel are dispatched, drivers approaching the incident location are informed through electronic message boards that they may be delayed. The boards give the distance to the incident location and identify parallel arterial routes that will allow drivers to bypass the delay. The same information can also be provided via highway advisory radio.

Once drivers have been informed of a delay, a network of centrally-control led traffic signals must be activated along parallel arterials to facilitate traffic flow around the delay by providing diverted traffic with longer green lights. These signals are coordinated with additional message boards to direct drivers along the alternate route and back to the freeway. Such a network is difficult to build because of the many different agencies (cities, state, etc.) involved and the limited number of parallel arterials which are already congested.

6. *Grade Separations*

Since the adoption of the Measure A Expenditure Plan, grade separations have been built at Fifth Avenue, Jefferson Avenue, Howard Avenue, Brittan Avenue, Holly Street, Harbor Boulevard, Ralston Avenue, 42nd Avenue, Millbrae Avenue

and Oyster Point Boulevard. These projects have cost a total of $186 million of which $106 million has come from Measure "A" funds.

The recently adopted Rapid Rail Study identified potential new grade separation projects and prioritized them. The cost of the 14 highest priority projects is estimated at $590,000,000. The Transportation Authority has only $90,000,000 left in its funds for grade separations. Given this large shortfall of $500,000,000, the Transportation Authority needs to work very closely with the cities to determine the best way to use such limited funding.

This year's Governor's budget funds three new grade separations. Also, the TA is funding an evaluation of three grade crossings north of downtown San Mateo.

C. ROAD POLICIES

6.1. Definition of Corridors of Regional Significance

Define the following as corridors of regional significance: (1) Northern 1, (2) Southern 1, (3) Eastern 84, (4) Western 84, (5) Eastern 92, (6) Western 92, (7) Northern 101, (8) Southern 101, (9) Northern 280, (10) Southern 280, and (11) 380 (see Exhibit 6.1).

6.2. Prioritization of Corridors of Regional Significance

Develop improvement plans for each corridor of regional significance. Prioritize the development of improvement plans according to projected relative levels of congestion of each corridor. Determine relative level of congestion by measuring the following: (1) Volumes, (2) Vehicle Hours of Delay, and (3) Levels of Service (LOS). Set the following priorities:

a. Very High Priority: Northern 101.

b. High Priority: Northern 280, Southern 101, Northern 1 (Pacifica to Devil's Slide), and Eastern 92.

c. Medium Priority: Western 92, Southern 280, Eastern 84, Northern 82, and Southern 82.

d. Low Priority: 380, and Western 84.

e. Very Low Priority: Southern 1.

6.3 Priorities for Types of Roadway Strategies and Improvements

In general, give priorities to improvement projects which are projected to be the most congested in 2010. In general, set the following priorities for addressing roadway congestion:

a. Pursue strategies to reduce automobile travel demand (i.e.: TDM).

b. Make operational and safety improvements to increase efficiencies of existing roadways.

c. Make maintenance and rehabilitation improvements to improve conditions of existing roadways.

d. Make capacity improvements (e.g.: new roads, new mixed flow lanes).

6.4 Priorities for Location of Roadway Improvements

In general, give priority to improvement projects which are in the most congested corridors. Set the following priorities for making improvements in roadway segments:

a. Existing segments at LOS F.

b. Existing segments with high Vehicle Hours of Delay.

c. Projected segments at LOS F.

d. Projected segments with high Vehicle Hours of Delay.

6.5 Northern 1--Strategy and Priority Improvements

a. Strategy

Make operational and safety improvements.

b. Planned Improvements (Pacifica to Devil's Slide)

(1) Auxiliary lanes.

(2) Operational and safety improvements at intersections.

(3) Tunnel.

c. Potential Improvements

Intelligent transportation systems.

6.6 Northern and Southern 82 (El Camino Real)--Strategy and Priority Improvements

a. Strategy

Make operational and safety improvements.

b. Planned Improvements

Signal timing and interconnects.

c. Potential Improvements

Intelligent transportation systems.

6.7 Eastern 84--Strategy and Priority Improvements

a. Strategy

Increase capacity.

b. Planned Improvements

(1) New roads.

(2) New mixed flow lanes.

(3) Interchange improvements.

c. Potential Improvements

(1) New roads.

(2) Intelligent transportation systems.

(3) Ramp metering.

(4) Grade separations.

(5) Converted High Occupancy Vehicle (HOV) lanes.

(6) Signal timing.

6.8 Western 84--Strategy and Priority Improvements

a. Strategy

Increase capacity.

b. Planned Improvements

New mixed flow lanes.

c. Potential Improvements

(1) Intelligent transportation systems.

(2) Signal timing.

6.9 Eastern 92---Strategy and Priority Improvements

a. Strategy

Improve on-off weaving operations.

b. Planned Improvements

New mixed flow lanes.

c. Potential Improvements

(1) Interchange improvements.

(2) Intelligent transportation systems.

(3) Ramp metering.

(4) Ramp modifications.

(5) Converted high occupancy vehicle lanes.

(6) Converted high occupancy toll lanes.

(7) New high occupancy vehicle lanes.

6.10 Western 92--Strategy and Priority Improvements

a. Strategy

Make operational and safety improvements.

b. Planned Improvements

(1) New mixed flow lane (uphill).

(2) Operational and safety improvements (realignment).

c. Potential Improvements

(1) Intelligent transportation systems.

(2) Ramp metering.

6.11 Northern 101--Strategy and Priority Improvements

a. Strategy

(1) Improve on-off weaving operations.

(2) Increase capacity of interchanges.

b. Planned Improvements

(1) Auxiliary lanes.

(2) Interchange improvements.

(3) Ramp metering.

c. ***Potential Improvements***

(1) Intelligent transportation systems.

(2) New high occupancy vehicle lanes.

(3) New high occupancy toll lanes.

6.12 Southern 101--Strategy and Priority Improvements

a. ***Strategy***

Improve on-off weaving operations.

b. ***Planned Improvements***

(1) Auxiliary lanes.

(2) Interchange improvements.

c. ***Potential Improvements***

(1) Intelligent transportation systems.

(2) Ramp metering.

6.13 Northern 280--Strategy and Priority Improvements

a. ***Strategy***

Improve on-off weaving operations.

b. ***Potential Improvements***

(1) Auxiliary lanes.

(2) Interchange improvements.

(3) Intelligent transportation systems.

(4) Ramp metering.

(5) Ramp modifications.

6.14 Southern 280--Strategy and Priority Improvements

a. Strategy

Improve on-off weaving operations.

b. Potential Improvements

(1) Auxiliary lanes.

(2) Interchange improvements.

(3) Intelligent transportation systems.

(4) Ramp metering.

(5) Ramp modifications.

6.15 380--Strategy and Priority Improvements

a. Strategy

Make operational and safety improvements.

b. Planned Improvements

Interchange improvements.

c. ***Potential Improvements***

(1) Intelligent transportation systems.

(2) Ramp metering.

6.16 *Conversion of Existing Lanes on Corridors Northern and Southern 101*

Prohibit the conversion of existing multi-flow and existing and planned auxiliary lanes to HOV lanes.

6.17 *Types of Roadway Improvements for All Other Corridors*

When developing improvements plans for all other corridors, refer to Exhibit 6.7 for potential capacity and operational improvements.

6.18 *Grade Separations*

Work closely with cities to determine the optimum way to use limited funds to build grade separations considering such factors as cost/benefit, jurisdictional commitment, and environmental impacts.

6.19 *Role of the Transportation Authority*

a. Plan, coordinate, and undertake roadway improvements in the corridors of regional significance in the County.

b. Coordinate with CalTrans.

6.20 *Role of the Cities*

Plan, coordinate, and undertake roadway improvements on major arterials and local streets and roads in the County.

6.21 Role of MTC

Request that MTC allocate State and federal funds to San Mateo County based on 100 percent of the estimated needs for local streets and roads.

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Exhibit 6.1

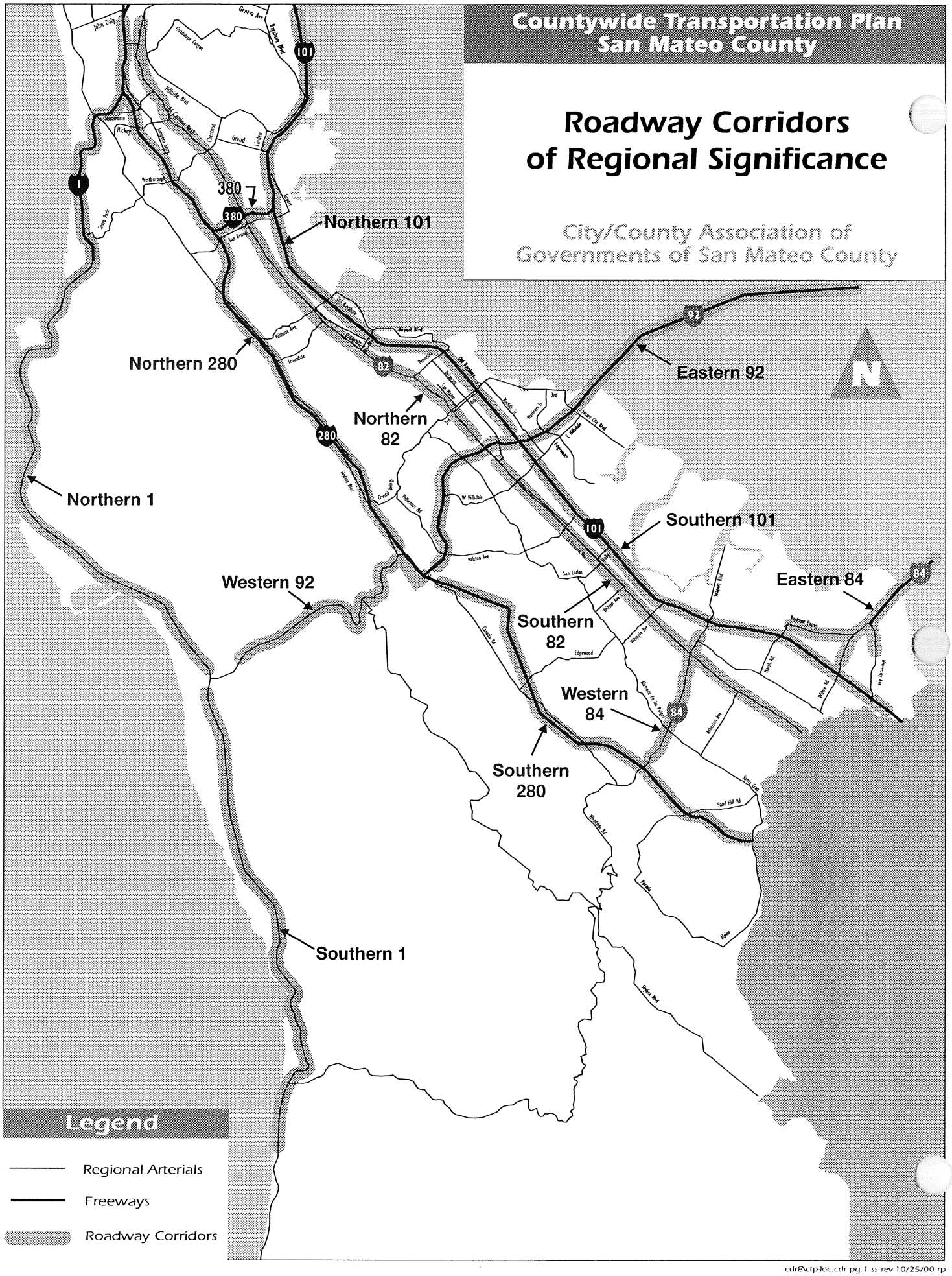

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Exhibit 6.2

San Mateo County Countywide Transportation Plan

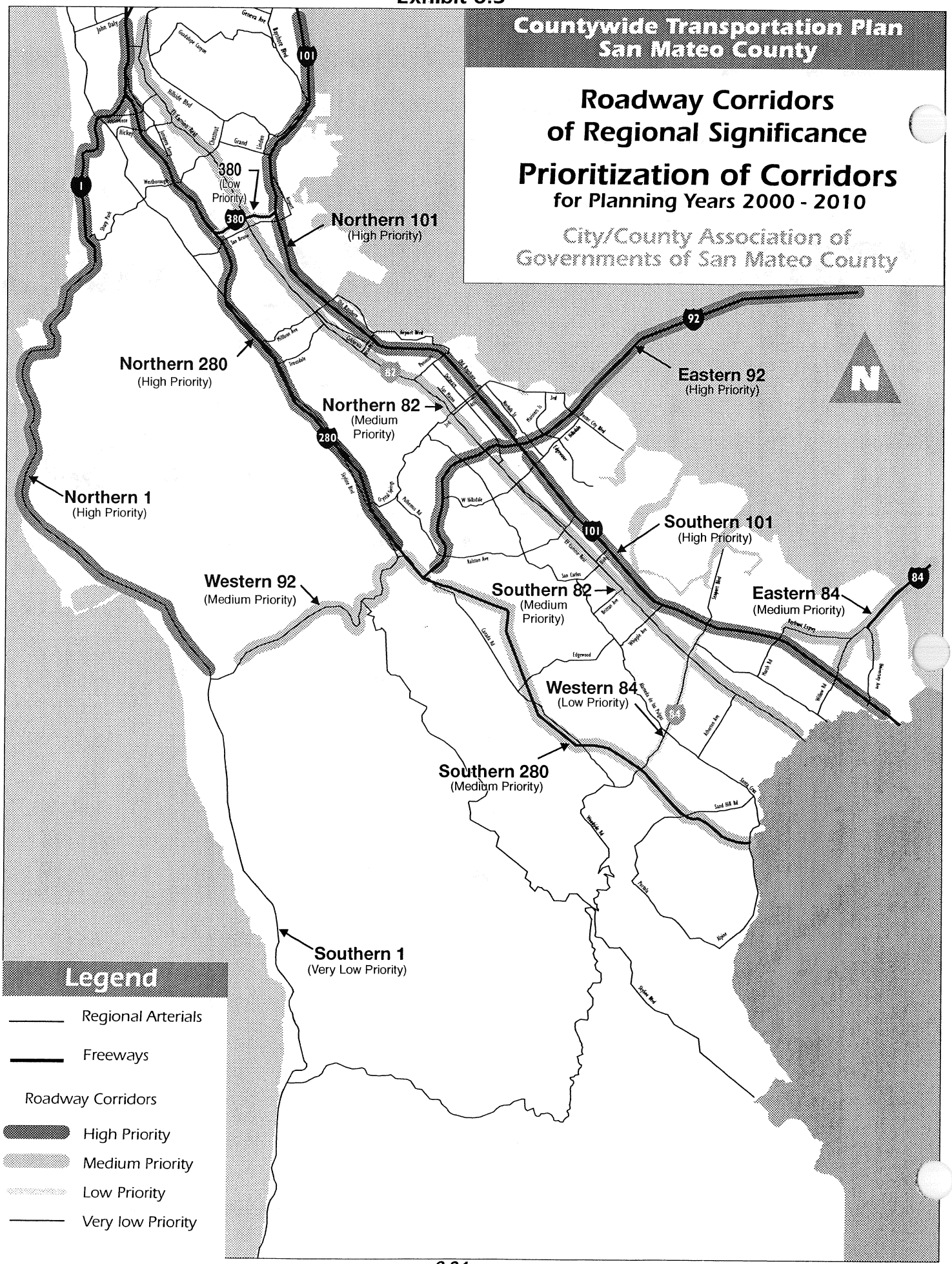
Projected Congestion

for Corridors of Regional Significance ▪ Vehicle Hours of Delay - PM 1990 and 2010 (Alt. 6c)[1]

Priority	Corridor	1990	1999	2010 (Alt. 6c)	Increase(%) 1990-2010
Very High	N 101	2517 (.25)	2808 (.23)	3099 (.22)	582 (.23)
High	N 280	1557 (.15)	1712 (.14)	1866 (.13)	309 (.20)
	N 1	569 (.06)	1129 (.09)	1688 (.12)	1119 (1.97)
	E 92	1127 (.11)	1406 (.12)	1685 (.12)	558 (.50)
	S 101	1461 (.14)	1523 (.12)	1585 (.11)	124 (.08)
Medium	W 92	336 (.03)	702 (.06)	1067 (.08)	731 (2.18)
	S 280	856 (.08)	909 (.07)	961 (.07)	105 (.12)
	E 84	592 (.06)	703 (.06)	814 (.06)	222 (.38)
	N 82	458 (.04)	532 (.04)	606 (.04)	148 (.32)
	S 82	449 (.04)	452 (.04)	455 (.03)	6 (.04)
Low	380	131 (.01)	164 (.01)	196 (.01)	65 (.50)
	W 84	122 (.01)	138 (.01)	153 (.01)	31 (.25)
Very Low	S 1	35 (.00)	34 (.00)	34 (.00)	-1 (-.03)
	Totals	10,210 (1.00)	12,209 (1.00)	14,209 (1.00)	3999 (.39)

[1] Assumes construction of Strategic Plan projects (Transportation Authority), BART Extension to SFO, and Caltrain Extension to Downtown SF.

Exhibit 6.3



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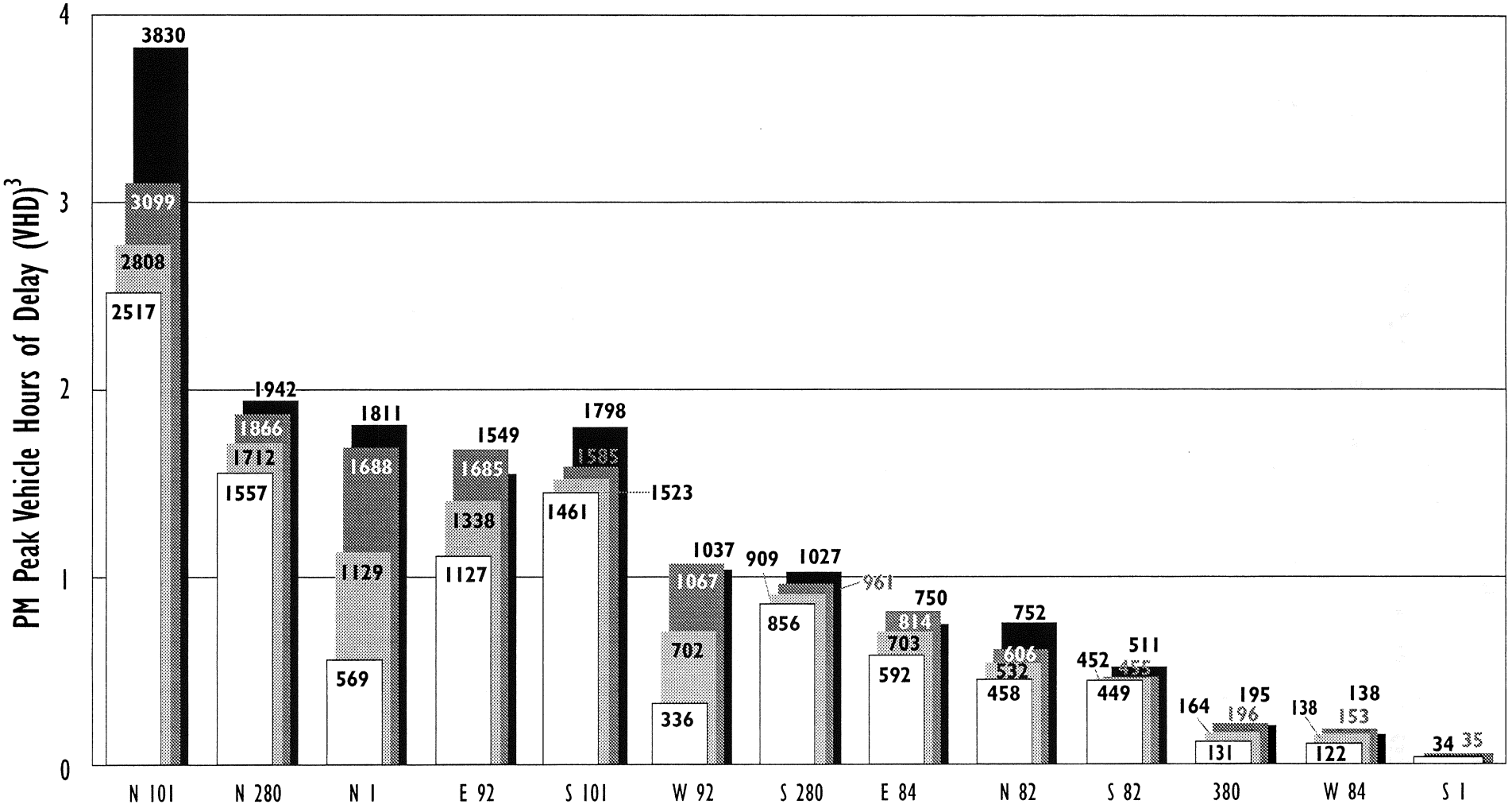
Projected Congestion for Corridors of Regional Significance

Vehicle Hours of Delay - PM 1990,1999 and 2010 (Alt. 2b and 6c)



1990 | 1999 | 2010 (Alt.6c)[1] | 2010 (Alt.2b)[2]

[1] Assumes construction of RTP Baseline projects, Strategic Plan projects (Transportation Authority), BART Extension to SFO, and CalTrain Extension to Downtown SF.

[2] Assumes construction of only RTP Baseline Projects.

[3] Hours with speeds below 35 miles per hour for at least 15 minutes.

Exhibit 6.5

San Mateo County Countywide Transportation Plan

Projected Reduction of Congestion Increase Due to Proposed Roadway and Transit Improvements[1]

for Corridors of Regional Significance ▪ Vehicle Hours of Delay - PM 2010 (Alt. 6c)[1]

	Corridor	Change in Vehicle Hours of Delay	Annual Savings $M
↓	N 101	731 (.19)	15.9
	S 101	213 (.12)	4.6
	N 82	146 (.19)	3.1
	N 1	123 (.07)	2.7
	S 82	56 (.11)	1.2
	N 280	76 (.04)	1.6
	S 280	66 (.06)	1.4
	S 1	1 (.03)	.2
↑	380	1 (.005)	-.2
	W 84	15 (.11)	?
	W 92	30 (.03)	-.6
	E 84	64 (.09)	-1.4
	E 92	136 (.09)	?
Total			28.7

[1]Assumes construction of Strategic Plan projects (Transportation Authority), BART Extension to SFO, and Caltrain Extension to Downtown SF.

Exhibit 6.6

San Mateo County Countywide Transportation Plan

Comparison of Projected Congestion and Cost of Proposed Improvements by Corridor 2010

Corridor	% Congestion[3]	Number of Improvement Projects	Total Improvement Costs $M	% of Total Cost
N 101	.22	7	213.1	.37
N 280	.13	0	0	.00
N 1	.12	4	78.5[2]	.14
E 92	.12	0	0	.00
S 101	.11	5	92.4	.16
W 92	.08	1	81.6	.14
S 280	.07	0	0	.00
E 84	.06	1	115.1	.20
N 82	.04	0	0	.00
S 82	.03	0	0	.00
380	.02	0	0	.00
W 84	.01	0	0	.00
S 1	.00	0	0	.00
Totals	1.00	18	580.7	1.00

[1] Measure A and STIP Funds
[2] Devil's Slide not included
[3] Percent of total Vehicle Hours of Delay

Projected Congestion for Corridors of Regional Significance
Vehicle to Capacity Ratios (V/C Ratios) or Levels of Service - PM
2010

Expressed in Percentage of Segments on Each Corridor which Exceed 1.00 or at LOS F or greater

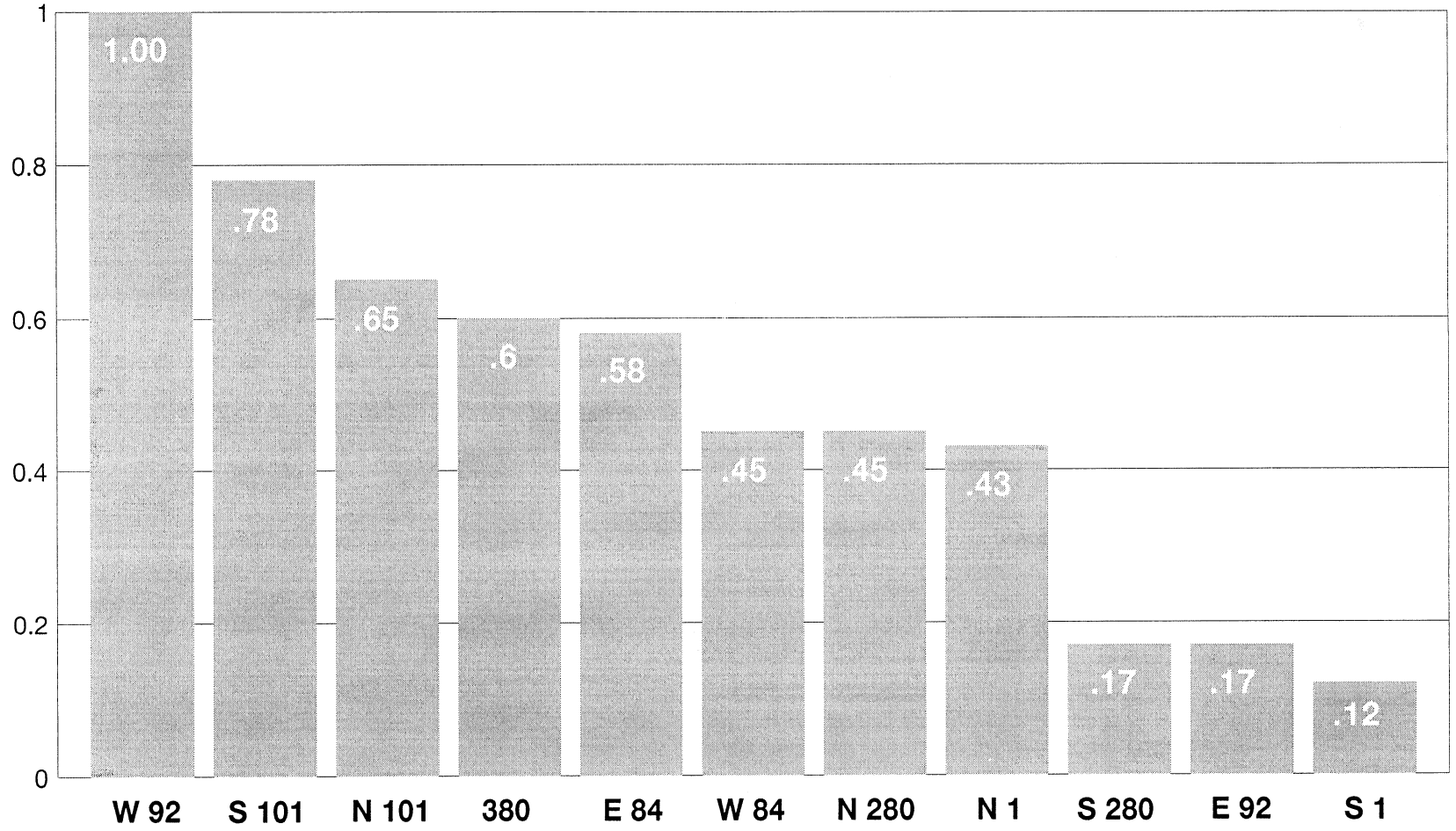


Exhibit 6.8

San Mateo County Countywide Transportation Plan

Projected Congestion

Ranking of Corridors of Regional Significance
Comparison of VHD and V/C Ratios

Ranking	Vehicle Hours of Delay	Volume to Capacity Ratios or Levels of Services (V/C Ratios)
Very High	N 101	W 92
High	N 280	S 101
	N 1	N 101
	E 92	380
	S 101	E 84
Medium	W 92	W 84
	S 280	N 280
	E 84	N 1
	N 82	
	S 82	
Low	380	S 280
	W 84	E 92
		S 1
Very Low	S 1	

Exhibit 6.9

Strategies for Roadway Improvements by Corridor

Strategy	N 1	S 1	N 82	S 82	E 84	W 84	E 92	W 92	N 101	S 101	N 280	S 280	380
Make Operational & Safety Improvements	✔		✔	✔			✔	✔					✔
Improve On-Off Weaving Operations									✔	✔	✔	✔	
Increase Capacity					✔	✔							
Increase Capacity of Interchanges									✔				

Exhibit 6.10

Planned and Potential Types of Roadway Improvements by Corridor

Improvements	N 1	S 1	N 82	S 82	E 84	W 84	E 92	W 92	N 101	S 101	N 280	S 280	380
New Roads					✔ ✓								
New Mixed Flow Lanes					✔	✔	✔	✔					
Auxilary Lanes	✔								✔	✔	✓	✓	
Interchange Improvements					✔		✓		✔	✔	✓	✓	✔
Intelligent Transportation Systems	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ramp Metering					✓		✓	✓	✔	✓	✓	✓	✓
Ramp Modifications	✓						✓				✓	✓	
Grade Separations					✓								
Operational & Safety Improvements	✔							✔					
New High Occupancy Vehicle Lanes (HOV)							✓		✓				
Converted High Occupancy Vehicle Lanes (HOV)					✓		✓						
New High Occupancy Toll Lanes (HOT)									✓				
Converted High Occupancy Toll Lanes (HOT)							✓		✓				
Signal Timing			✔	✔	✓	✓							

✔ = Planned ✓ = Potential

Exhibit 6.11

Countywide Transportation Plan

Strategic Plan Roadway Projects that Will Be Completed by 2010

(Due to the Availability of Anticipated Measure A and STIP Revenues)

	PROJECT	COST (in millions
1	Fassler to Westport Widening	$6.5
84	El Camino to Broadway Widening	$7.0
101	Oyster Point Phases 2 and 3	$40.0
101	Third to Millbrae Auxiliary Lanes/Peninsula Interchange Reconstruction	$81.8
101	Willow Road Interchange Reconstruction	$24.5
101	Marsh to Santa Clara County Line Auxiliary Lanes	$32.6
280	380 Local Access Improvements	$5.0
	Claims and Contingencies for Projects Built or Under Construction	$13.5
	Balance	$22.6
Total		$233.5

Exhibit 6.12

Strategic Plan Roadway Projects that Will Not Be Completed By 2010

(Due To Lack Of Measure A And Stip Revenues)

	PROJECT	COST (in millions)
1	Within Half Moon Bay	$32.1
84	Bayfront Extension Marsh to Woodside	$115.1
92	101 to 280 Uphill Lane	$81.6
101	Candlestick Interchange Reconstruction	$45.4
101	Broadway Interchange Reconstruction	$57.5
101	University Interchange Reconstruction	$35.3
101	Sierra Point to SF County Line Auxiliary Lanes	$3.3
101	San Bruno to Sierra Point Auxiliary Lanes	$25.5
280	EB 1 to SB 280 and Serramonte Boulevard	$39.8
280	Crestview Drive Connection	——-
Total		$435.6

Exhibit 6.3

San Mateo County Countywide Transportation Plan

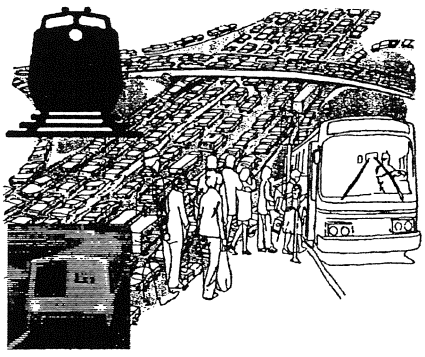
Pavement Condition by Jurisdiction

JURISDICTION	MILES	1997 Pavement Condition (miles)			
		Poor	Fair	Satisfactory	Good
Unincorporated County	320.5 (1.00)	147.4 (0.46)	51.3 (0.16)	51.3 (0.16)	70.5 (0.22)
Daly City	113.8 (1.00)	30.7 (0.27)	38.7 (0.34)	13.7 (0.12)	30.7 (0.27)
Half Moon Bay	26.0 (1.00)	7.0 (0.27)	4.9 (0.19)	4.9 (0.19)	9.1 (0.35)
Pacifica	89.8 (1.00)	21.6 (0.24)	8.9 (0.10)	12.6 (0.14)	46.7 (0.52)
Menlo Park	96.3 (1.00)	18.3 (0.19)	27.0 (0.28)	24.0 (0.25)	27.0 (0.28)
East Palo Alto	38.5 (1.00)	15.4 (0.18)	7.7 (0.20)	8.4 (0.22)	15.4 (0.40)
San Bruno	78.7 (1.00)	11.0 (0.14)	20.5 (0.26)	22.9 (0.29)	24.4 (0.31)
Woodside	47.4 (1.00)	3.8 (0.08)	9.5 (0.20)	15.2 (0.32)	19.0 (0.40)
Belmont	64.4 (1.00)	3.2 (0.05)	7.7 (0.12)	10.9 (0.17)	42.5 (0.66)
Brisbane	20.8 (1.00)	0.9 (0.05)	0.8 (0.04)	6.0 (0.29)	12.9 (0.62)
Burlingame	80.9 (1.00)	4.0 (0.05)	8.9 (0.11)	23.5 (0.29)	44.4 (0.55)
San Carlos	82.2 (1.00)	4.1 (0.05)	11.5 (0.14)	17.3 (0.21)	49.0 (0.60)
South San Francisco	123.8 (1.00)	6.1 (0.05)	11.0 (0.09)	23.5 (0.19)	82.9 (0.67)
San Mateo	190.4 (1.00)	7.6 (0.04)	39.9 (0.21)	93.3 (0.49)	49.5 (0.26)
Atherton	50.0 (1.00)	0.5 (0.01)	7.0 (0.14)	15.0 (0.30)	27.5 (0.55)
Colma	7.8 (1.00)	Not available	Not available	Not available	Not available
Hillsborough	81.0 (1.00)	"	"	"	"
Millbrae	53.0 (1.00)	"	"	"	"
Redwood City	155.5 (1.00)	"	"	"	"
Total	1,809.3	282.1	260.0	354.2	622.4
	1,512.0	282.1 (18.7)	260.8 (17.2)	354.2 (23.4)	622.4 (41.1)
		(35.9)		(64.5)	

Source: M 1997

Chapter 7

Bikeways



VII. BIKEWAYS

A. BACKGROUND

1. Comprehensive Bicycle Route Plan

The City/County Association of Governments recently released a draft version of the San Mateo County Comprehensive Bicycle Route Plan for public comment. The purpose of this document is to coordinate and guide the provision of all bicycle-related plans, programs, and projects within the County, according to a recommended "primary bikeway system" (see maps). This system is composed of recreational and commuter routes throughout the County that were selected based on extensive input from public workshops, surveys, and local officials. In developing the system, emphasis was placed on connecting existing segments of bike lanes, addressing routes used by bicyclists, and focusing on specific opportunities and constraints.

In order to begin completing the bikeway system, the plan recommends fifteen projects as top priorities to be implemented over the next five to ten years (see table). The plan estimates a total cost of $19.2 million for these projects, of which $2.2 million would come from local sources. In addition, the plan proposes about $1.6 million over twenty years for bicycle programs such as maintenance of paths, parking facilities, education and safety programs, and various incentive programs (see table).

Ultimate responsibility for implementing recommended capital improvements will lie with the local jurisdictions where the improvement is located. However, the plan facilitates local implementation by identifying current bicycle funding programs, encouraging multi-jurisdictional funding applications, and developing a prioritized list of route segments with detailed information such as length, cost, environmental impact, project readiness, and overall feasibility. Cities and the County would cooperate in a project selection process, so that local funds are awarded to the projects that provide the greatest benefit. The plan also suggests several policies geared toward ensuring connectivity and standardized design for the various individual improvements.

The plan projects that, with implementation of the proposed improvements and programs, bicycle commuting could double by 2010 (to a 1.5 percent mode share), saving about 4.5 million vehicle trips and 8.5 million vehicle miles per year. Because this projection does not include those who bike to transit, nor

recreational, school, and other non-work trips made on bicycle, the plan's impact could be much higher. While the plan's recommendations alone will not bring dramatic alleviation of the County's traffic congestion, bicycle-related improvements in conjunction with sound transit and land use policies will significantly increase the attractiveness of bicycling as an alternative to driving.

For further reference, the following policies from the Comprehensive Bicycle Route Plan are provided:

- Develop a tool to plan, design, implement, and maintain bicycle infrastructure in San Mateo County.
- Encourage public participation through local coordination with County staff.
- Build upon the existing bikeway system and programs in San Mateo County.
- Develop a countywide bicycle system that meets the needs of commuter and recreational users, helps reduce vehicle trips, and links residential neighborhoods with local and regional destinations.
- Maximize multi-modal connections to the bicycle system.
- Improve bicycle safety conditions in San Mateo County.
- Develop detailed and ranked improvements in the Comprehensive Bicycle Route Plan.
- Develop a coordinated strategy to develop support facilities and programs in San Mateo County.
- Maximize the amount of State and federal funding for bicycle improvements that can be received by San Mateo County.
- Anticipate impacts of future developments along existing and proposed bicycle improvements.

B. ISSUES

Bicycling represents one of the most cost-effective ways of reducing automobile use in San Mateo County. Bicycles offer considerable personal and social benefits over the automobile, including substantially lower acquisition and maintenance costs, health benefits, reduced air and noise pollution, and energy conservation. In addition, bicycling is often the fastest form of transportation in areas with high traffic congestion and a short supply of parking. For these reasons, bicycling can be a viable and attractive alternative to the automobile, particularly in areas that are not well served by public transit.

Bicycle use is most feasible when trips are relatively short (i.e., less than 5 miles), terrain is flat, traffic conditions are calm, secure parking is available at the destination and lockers and showers are available. San Mateo County offers several advantages for bicyclists. The County's major population and employment centers are located within a few miles to the east and west of the El Camino Real corridor, creating numerous opportunities for using bicycles to get to work or shop. Further, due to its location in the bay plain, the topography in this part of the County is mostly flat. Moreover, bicycles can be brought aboard SamTrans buses and Caltrain commuter trains, which facilitate travel in the north-south direction.

The major impediment to bicycle use in San Mateo County is that the road network was principally designed for the automobile, which frequently sacrifices bicycle safety and comfort. High auto speeds, inadequate shoulder widths, poor signage or road markings, broken or uneven pavement, physical obstacles, and difficult to maneuver freeway overpasses and interchanges all present serious safety hazards and discourage bicycle use. These impediments force bicyclists to use and share sidewalks with pedestrians. Another significant obstacle to bicycle use is that bikeways have generally been developed over time by the County and individual cities in a piecemeal and uncoordinated fashion, resulting in significant gaps and lack of continuity in the bikeway network. Also, in some areas steep hills obstruct east-west bicycle travel.

The *Countywide Transportation Plan* presents policies related to bicycle use under a variety of policy headings. For example, policies promoting bicycle-friendly project design are included in the land use section, while policies promoting improved bicycle access on public transit are contained in the transit section. The policies presented below relate specifically to improving County roadways to accommodate bicycles.

C. POLICIES

7.1 Travel Demand

Increase the use of bicycles as a travel mode by developing a comprehensive bikeway system with clearly marked routes which effectively connects residential areas to employment centers, retail centers, transit stations, and institutions.

7.2 Market Share

Increase bicycle system market share from .075 to 1.5 percent of work trips in 2010.

7.3 Performance

Develop a safe, reliable, and convenient bikeway system with loop detectors.

7.4 Integration

a. Develop a bikeway system which is fully integrated with other transit modes (i.e., connections to Caltrain).

b. Provide more incentives for integrating bicycle and transit modes.

c. Encourage adequate facilities to carry bicycles on Caltrain, BART, and SamTrans, so long as station dwell times are not significantly increased. Increase wayside bicycle storage.

7.5 Safety and Education

Ensure that new major capital roadway improvements (e.g., interchanges) safely accommodate bicycle and pedestrian travel.

7.6 New Development

a. Ensure that new developments, particularly employment developments, encourage the use of bicycles by providing effective access and support facilities (e.g.: showers, bike lockers).

b. Encourage cities to refer large development proposals to the Bikeways Committee for review and advice in order to create bicycle friendly development.

7.7 Financing

Aggressively seek funding for the development of the bikeway system.

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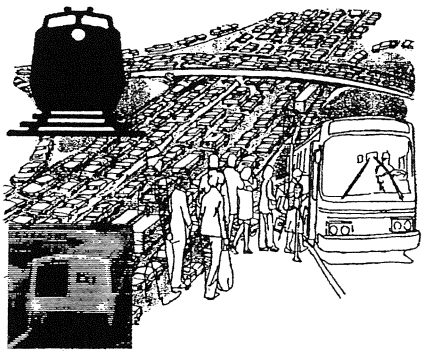
Chapter 8

Transit



VIII. TRANSIT

A. BACKGROUND

1. Existing System

There are three primary transit operators in San Mateo County: BART, Caltrain, and SamTrans. Currently, all three are in the process of modifying or expanding services and infrastructure to improve coordination with the other operators and to attract new riders. This section gives a brief description of the County's existing transit system and summarizes the most significant changes underway.

The Bay Area Rapid Transit District (BART) operates electrified heavy-rail trains between the East Bay and Colma via downtown San Francisco. BART is currently constructing an extension to San Francisco International Airport and Millbrae, where a direct transfer to Caltrain will be possible. Santa Clara County officials have recently discussed extending BART to San Jose from Fremont.

Caltrain is another heavy-rail service that operates diesel-powered trains between downtown San Francisco and Gilroy, with 14 stations along the urban bayside corridor of San Mateo County. As part of a systemwide upgrading program, Caltrain is making several improvements to the County's portion of the line, the largest of which is a grade separation project in Belmont and San Carlos. Other improvements such as electrification and an extension to downtown San Francisco have been planned but not funded.

Finally, the San Mateo County Transit District (SamTrans) operates buses throughout the County, with express service to downtown San Francisco and connecting service to Santa Clara Valley Transportation Authority buses at the Palo Alto Caltrain station. SamTrans recently restructured most of its bus routes to increase coordination with Caltrain service.

2. Potential New Transit Services

Work is currently underway to introduce five major new transit services to San Mateo County. The first of these is high-speed rail, which would initially connect downtown San Francisco to Los Angeles via San Jose and the Central Valley, with later extensions to Sacramento and San Diego. The primary goal of high-speed rail would be to provide an alternative to airplane and long-distance

automobile travel; however, the service would also benefit local commuters by serving major stops along the Peninsula corridor. High-speed rail would probably be funded by a statewide tax and would not be completed before 2015. See the high-speed rail chapter for more details.

The second new service is increased Caltrain express service (i.e., "Baby Bullet"). This service will increase the number and speed of express trains and provide passing tracks.

A third new potential service is Raid Bus service on 280 and the San Mateo-Hayward Bridge. A fourth new service is the possible extension of Caltrain across the Dumbarton Bridge.

The fifth potential new transit service in the County is a network of high-speed ferries. The State Legislature has passed a bill that would establish a Bay Area Water Transit Authority to develop a detailed financial and operating plan for this ferry network. The Bay Area Council, a corporate-sponsored public policy group that is taking the lead in this effort, has issued a preliminary plan which identifies seven potential ferry terminals in San Mateo County. See the Ferries Chapter for more details.

3. *Potential Alternatives for a Future Transit System*

County transportation planners and policy makers support transit improvement as an integral part of mitigating the County's worsening traffic situation. However, due to limited funding, only some of the many proposed improvements will be completed. For the purposes of analysis, staff has created eight potential alternatives for the development of a comprehensive future transit system in San Mateo County. Staff recommends that these eight alternatives be studied in detail over the next two years. During this period, staff will: (1) analyze feasibility of each alternative, (2) forecast travel demand, (3) estimate costs, and (4) conduct cost/benefit analyses.

a. *Alternative 1*

The first alternative is the "baseline" alternative which is based on current plans and programs. It includes three components: an upgraded and modernized Caltrain, BART to SFO/Millbrae, and SamTrans bus service.

b. Alternatives 2a and 2b

The second alternative includes four components. The first of these is an upgraded and modernized Caltrain, with electric propulsion, 25 percent faster run times, increased frequency, and increased express service. The second component is BART with its SFO/Millbrae extension completed. Third is SamTrans bus service, which would function primarily as a feeder to Caltrain and BART, with additional service where demand warrants. Fourth is high-speed ferry service as envisioned by the Bay Area Council's Water Transit Initiative. Alternative 2a does not include a Dumbarton extension while 2b does.

c. Alternative 3

The third alternative is identical to the second, except that high-speed rail is added as a fifth component. In this alternative, high-speed rail and Caltrain share the same right-of-way.

d. Alternative 4

The fourth alternative is identical to the third, except that BART is extended from Millbrae to San Jose in a new right-of-way, perhaps the median of Highway 101.

e. Alternative 5

In the fifth alternative, BART replaces Caltrain in the current Caltrain right-of-way, which it shares with high-speed rail. SamTrans and ferries are also included.

f. Alternative 6

In the sixth alternative, BART is extended to San Jose within the Caltrain right-of-way; however, Caltrain continues to operate its current service. There is no high-speed rail. SamTrans and ferries are also included.

g. Alternative 7

In the seventh alternative, BART replaces Caltrain in the current Caltrain right-of-way, becoming the only rail transit service in the County. SamTrans and ferries are also included.

B. ISSUES

Because these alternatives will require substantial investment of public funds, it is important to analyze the relative benefits and costs of each alternative.

a. Alternative 1

The first alternative reflects what is currently planned for transit improvements to Caltrain, BART and SamTrans.

Advantages: This would be the least costly of the alternatives. It would achieve significant increases in transit ridership.

Disadvantages: This alternative does not include the advantages that high-speed rail service would bring to the County, namely the opportunity to share the costs of Caltrain improvements and to provide fast rail commute service from San Jose to San Francisco.

b. Alternatives 2a and 2b

The second alternative features major Caltrain improvements and the addition of ferry service to the existing County transit network. These improvements would attract significant new transit ridership by creating a continuous rapid rail corridor and providing vital regional connections to the corridor via ferries. SamTrans' primary role in this system would be to deliver riders to rail stations and connect rail stations with ferry terminals.

Advantages: This would be the second least costly of the eight alternatives, but it would still bring significant reductions in congestion. By maintaining conventional commuter rail technology in the Caltrain right-of-way, a number of possibilities for future rail connections would be left open, including access to Fremont, Pleasanton, and the Central Valley via

the Dumbarton rail bridge. In addition, commuter rail would allow express service to San Francisco and San Jose, an extremely popular service that saves considerable time over typical local service.

Disadvantages: This alternative would not connect San Mateo County to the statewide high-speed rail system. In addition, the opportunity to harness State and federal high-speed rail funds for Caltrain improvements would be lost.

c. *Alternative 3*

In the third alternative, construction of high-speed rail would be coordinated with an exhaustive upgrade of Caltrain, using federal and State funds to create a grade-separated rail corridor with sufficient capacity for both systems. These two systems would be linked to BART at Millbrae. Ferries would provide links to various points around the Bay, and SamTrans bus service would connect ferry terminals with the rail corridor.

Advantages: This alternative would meet a wide range of travel demands, from short-range intra-County trips to long-distance ones (i.e., San Francisco to Los Angeles) and dramatically improves mobility within the County from present conditions. With high-speed rail, travel times would be reduced significantly, and service coordinated with Caltrain local service to allow easy transfers between the two systems.

Disadvantages: Due to increased frequency and speed of trains in the Caltrain right-of-way, there would be new safety and noise concerns under this alternative. While many of these concerns could be mitigated, the overall intensity of activity within the Peninsula rail corridor would increase. Demand for parking and traffic around rail stations would increase, adjacent land uses might intensify, and the small-town, low-density atmosphere of some Peninsula towns might be affected. These types of impacts must be weighed against the benefit of having a world-class transit system that provides a strong incentive against driving.

d. Alternative 4

The fourth alternative provides the greatest number of transit options. It is also the costliest alternative by far. This alternative features three parallel rail lines: high-speed rail and Caltrain in the Caltrain right-of-way, and BART in its own right-of-way south of Millbrae. The BART extension would most likely run in the median of Highway 101. SamTrans would be a key component of this system by providing the east-west linkages between these north-south rail lines.

Advantages: This alternative would bring rapid rail very close to the County's largest employment centers, which are primarily located east of Highway 101. The BART stations would also be located closer to proposed ferry terminals than Caltrain. County residents bound for the East Bay would be able to board BART at the beginning of the trip and avoid the transfer from Caltrain to BART at Millbrae.

Disadvantages: The main disadvantage of this alternative is that it would spend scarce public funds inefficiently by creating three parallel rail lines through the County. Extending BART through the County would probably require the County to "buy in" to the BART District through a very large, lump-sum payment, something that would have to be approved by voters. The BART extension itself would create significant problems on Highway 101 during construction, and would present difficult engineering and access problems by locating stations between eight lanes of traffic.

e. Alternative 5

The fifth alternative is similar to the second, except that instead of Caltrain and high-speed rail sharing the Caltrain right-of-way, the right-of-way would be shared by high-speed rail and BART. In this scenario, rail passengers bound for downtown San Francisco would choose between taking the longer BART trip through Daly City or taking high-speed rail, which would run directly downtown from a few "major" Peninsula stops. Ferries and SamTrans would play similar roles as in the other alternatives.

Advantages: This alternative would facilitate the completion of the long-time vision of BART ringing the Bay. As in the previous alternative, County residents bound for the East Bay (or vice-versa) would not have to

transfer from Caltrain. Much of the cost of the BART extension might be shared by the State, since high-speed trains would have to share the same infrastructure (i.e., grade separations).

Disadvantages: Replacing Caltrain with BART would be much more expensive than upgrading Caltrain. BART stations would be larger and more visually dominant than Caltrain stations, and there will be fewer stations along the line than Caltrain currently serves. Building two separate rail systems, each with its own pair of tracks, would be very difficult to accomplish in the already-constrained Caltrain right-of-way. In contrast, upgraded Caltrain service would be able to share the same tracks as high-speed trains, requiring less total infrastructure, and less land. Finally, BART would not offer express service, as Caltrain currently does.

f. Alternative 6

The sixth alternative is probably the most unlikely, for it would create two virtually identical rail lines operating side by side. The only differences between Caltrain and BART would be Caltrain's ability to run express trains, stop at more stations, and use a shorter route to San Francisco due to the Bayshore cutoff.

Disadvantages: This alternative would probably waste public dollars by constructing two very expensive, but essentially identical rail lines.

g. Alternative 7

In this alternative, BART would replace Caltrain service rather than duplicate it.

Advantages: Public funds would be focused on one project, eliminating duplication of service. BART would provide a direct connection to most areas of San Francisco and the East Bay.

Disadvantages: This alternative would cost much more than the first one, yet the quality of service would be lower. BART's Peninsula line would have fewer stations than the current Caltrain line, forcing many riders to

travel further to reach the nearest station. In addition, express service would no longer be available--all BART trains would have to stop at every station. Extension of BART would also have greater aesthetic impacts on Peninsula communities than an upgraded Caltrain line.

C. TRANSIT GOAL

8.0 Increase the importance of transit as a travel mode by:

a. Increasing the demand to travel by transit.

b. Increasing transit services and reliability.

c. Increasing customer service.

d. Increasing transit safety.

e. Increasing the integration and non-duplication of transit systems.

TRANSIT POLICIES

8.1 Definition of Potential Components of a Comprehensive Transit System for the 21st Century

Define the following as components of a comprehensive transit system for the 21st Century: (1) High-Speed Rail, (2) Caltrain, (3) BART, (4) Light Rail(s), (5) SamTrans, (6) Shuttles, and (7) Ferries.

8.2 Development of Potential Alternatives for a Comprehensive Transit System for the 21st Century

Establish the following alternatives for the development of a comprehensive transit system:

a. ***Alternative 1***

Caltrain in Caltrain right-of-way
BART to Millbrae in BART right-of-way
SamTrans

b. ***Alternatives 2 and 2b***

Caltrain in Caltrain right-of-way
BART to Millbrae in BART right-of-way/Dumbarton Extension
SamTrans
Ferries

c. ***Alternative 3***

High-Speed Rail in Caltrain right-of-way
Caltrain in Caltrain right-of-way
BART to Millbrae in BART right-of-way
SamTrans
Ferries

d. ***Alternative 4***

High-Speed Rail in Caltrain right-of-way
Caltrain in Caltrain right-of-way
BART to San Jose in BART right-of-way
SamTrans
Ferries

e. ***Alternative 5***

High-Speed Rail in Caltrain right-of-way
BART to San Jose in Caltrain right-of-way
SamTrans
Ferries

f. Alternative 6

Caltrain in Caltrain right-of-way
BART to San Jose in Caltrain right-of-way
SamTrans
Ferries

g. Alternative 7

BART to San Jose in Caltrain right-of-way
SamTrans
Ferries

8.3 Analysis of Potential Alternatives

During the next two years, analyze the feasibility of each alternative. Forecast travel demand for 2020. Estimate costs. Conduct cost/benefit analyses.

8.4 Performance Objectives for a Comprehensive Transit System

a. Market Share

Increase transit system market share in 2010 (i.e.: percentage of transit trips) from a projected 11 to 15 percent for work trips and from a projected 5 to 10 percent for all trips.

b. Capacity

Increase transit system capacities (i.e.: rolling stock, frequency, ridership).

c. ***Performance***

Increase transit system performance (i.e.: reliability, convenience, comfort, safety).

d. ***Transit Time***

Decrease rail transit travel times by at least 25 percent. Decrease transit system travel times to 45 minutes between San Jose and San Francisco.

e. ***Access***

Increase transit system access (i.e.: automobile, bus, bicycle).

f. ***Integration***

Increase integration of transit system modes (i.e.: connections, linkages, transfers).

g. ***Customer Service***

Increase customer service (i.e.: customer friendly technology, customer friendly personnel).

h. ***Compatibility***

(1) Increase compatibility of transit system technologies.

(2) Ensure compatibility of transit system technologies with adjacent land uses.

i. ***Duplication***

Avoid duplication within the transit system (i.e.: redundancy, competition).

j. **Financial Stability**

Create a financially sound transit system.

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Potential Components of a Future Transit System

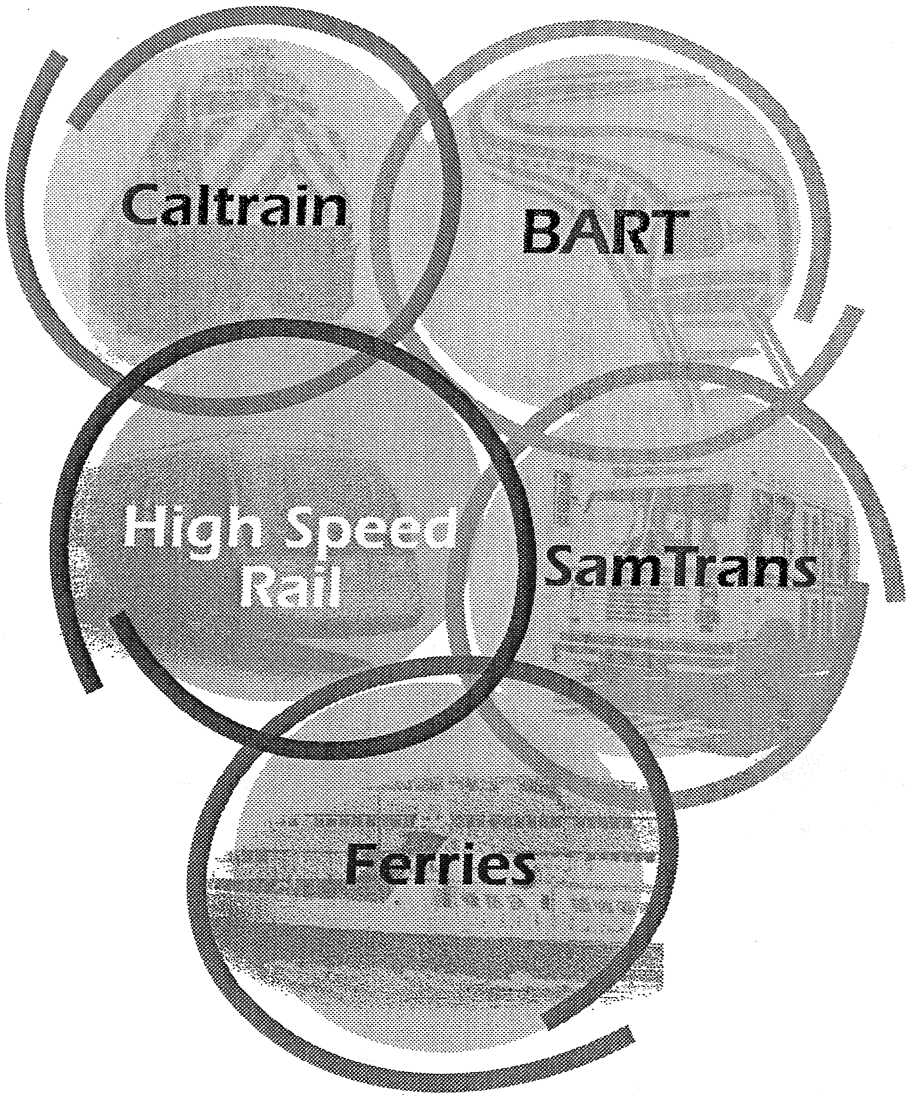

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Exhibit 8.3

San Mateo County • Countywide Transportation Plan

Roles of Major Transit Modes

SamTrans	❖ **Short-distance** feeder service to CalTrain and BART stations ❖ **Short-distance** service from City to City ❖ **Short-distance** service to transit dependent populations within County
CalTrain	❖ **Long-distance** commuter service to SF and Silicon Valley
BART (to Millbrae)	❖ **Short-distance** commuter service to SF and SFIA
BART (to San Jose)	❖ **Long-distance** commuter service to SF, Silicon Valley, and East Bay
High Speed Rail	❖ **Long-distance** transit service between SF and LA. ❖ **Fast long-distance** commuter service to and from SF, Peninsula, and Silicon Valley.

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Exhibit 8.4

Market Share

Auto vs Transit Projections and Goals 2010

	2010 Projected	2010 Goal	Change
Total Trips			
Auto	2,254,973 (.95)	2,133,309 (.90)	-121,664
Transit	115,370 (.05)	237,034 (.10)	+121,664
	2,370,343 (1.00)	**2,370,343 (1.00)**	
Work Trips			
Auto	704,968 (.89)	633,983 (.80)	-70,986
Transit	87,510 (.11)	158,496 (.20)	+70,986
	792,478 (1.00)	**792,478 (1.00)**	

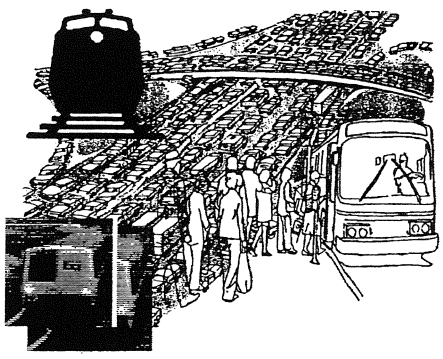
Exhibit 8.5

Market Share

Auto vs Transit
Projections and Goals
2010

Work Trips	2010 Projected	2010 Goal	Change
Drive Alone	598,153 (75.5)	499,261 (62.9)	-98,892
Shared Ride 2	82,014 (10.3)	95,967 (12.1)	+13,953
Shared Ride 3	24,801 (3.2)	38,754 (4.9)	+13,953
Transit	87,510 (11.0)	158,496 (20.0)	+70,986
Totals	**792,478 (100.0)**	**792,478 (100.0)**	

Chapter 9
High-Speed Rail



IX. HIGH-SPEED RAIL

A. BACKGROUND

1. Introduction

The construction of a high-speed rail network linking California's major metropolitan areas would be one of the largest public works projects in the State's history. In addition to providing a quick, safe and reliable mode of long-distance transportation, this project offers an unparalleled opportunity to upgrade local commuter rail service in San Mateo County. Because the new high-speed line will very likely utilize the Caltrain right-of-way from Gilroy to San Francisco, the Peninsula Corridor Joint Powers Board (JPB) should be able to "piggy-back" on the high-speed rail project in order to reach many of the long-range goals outlined in the Caltrain Rapid Rail Study.

High-speed rail service, still in the planning stage, is probably at least fifteen years away. The California High-Speed Rail Authority (CHSRA) has adopted a route and is currently preparing a business plan to be presented to the State legislature before the end of the year 2000. While financial, environmental, and jurisdictional constraints will have to be overcome before construction can begin, it is important that the JPB consider the possibility of high-speed rail in carrying out its long-range planning and current rehabilitation projects. Following is a discussion of the benefits and drawbacks of high-speed rail, as well as several areas where Caltrain improvements can be coordinated with the high-speed rail project.

2. Description

There are two primary purposes for building a high-speed rail system in California. First, it could provide an attractive alternative to air and auto travel between the State's northern and southern metropolitan areas (see attached maps); second, it could sustain and enhance daily mobility between adjacent regions as highways face increasing congestion.

There is a clear need for an alternative to air and long-distance automobile travel in California. The Bay Area-to-Los Angeles air travel corridor is the busiest in the nation, and as the State continues to prosper economically, airports that serve this market are increasingly struggling to accommodate the growing demand. High-speed rail would provide ground transport that rivals airplanes in cost and

speed. The technology tentatively selected by the CHSRA would allow express trains to travel from downtown San Francisco to downtown Los Angeles in about 2 hours and 40 minutes, at 70 percent the cost of the average airfare between the two cities. After factoring in the delays typically associated with air travel (i.e., early arrival, boarding/exiting, baggage claim, car rental, and weather or technical problems), high-speed rail could actually provide comparable door-to-door travel times with greater convenience, comfort, and safety, but at a lower cost.

In addition, rapid public transportation between adjacent metropolitan areas is sorely lacking. High-speed rail would connect rapidly growing residential areas (i.e., Gilroy and Los Banos) to established job centers (i.e., San Jose/Palo Alto and San Francisco), while avoiding the high environmental costs and declining quality of life associated with widespread, long-distance auto travel. This issue is discussed at greater length in the next section.

If funded within the next few years, the system could potentially begin operations within ten to fifteen years. After completion of a lengthy environmental review process, the first phase of the project would be construction of the mainline between the Bay Area and Los Angeles. Extensions to Sacramento and San Diego would be constructed as the second phase of the project. If initial funds are not sufficient to complete the entire first phase (estimated to cost between 11 and 21 billion dollars, depending on the selected train technology. Then key segments could be funded and built incrementally, completing the system as additional funding becomes available. The Peninsula rail corridor, with its relatively high densities and established ridership, would be a strong candidate for such an incremental first segment.

B. ISSUES

1. Advantages and Disadvantages

In addition to the opportunity for sharing funds with Caltrain, perhaps the greatest attraction of providing high-speed rail service in San Mateo County is the potential for limiting projected increases in roadway and freeway congestion over the next twenty years and beyond. As discussed elsewhere in this plan, the availability of affordable housing in the Central Valley and high-paying jobs in the County, is encouraging more workers to make long daily commutes between the two regions. While the vast majority of these trips are being made in single-occupant private vehicles, the success of the Altamont Commuter Express

between Stockton and San Jose demonstrates that increased rail service from the Central Valley is quite feasible.

The adopted high-speed rail route would more closely link the County to the booming bedroom communities of Gilroy, Los Banos, and Merced, providing an attractive alternative to auto travel. In concert with transit-oriented development and urban growth boundaries, high-speed rail could help the Central Valley avoid unchecked sprawl and avert a congestion crisis on Bay Area freeways. A planned high-speed rail connection to San Francisco International Airport would also alleviate traffic congestion considerably.

In addition to providing rapid interregional transit, high-speed service, with speed of approximate 80 miles per hour, between San Jose, Redwood City, SFO, and San Francisco, could induce local drivers to avoid Peninsula freeways and take the train instead. Caltrain's current express trains make several stops in addition to these four stations. A "super-express" service provided by high-speed trains could attract significant numbers of riders who feel that Caltrain's current run times do not warrant leaving their vehicles behind. Such a service would allow someone to travel from downtown San Jose to downtown San Francisco in about 45 minutes. Making one or two additional high-speed Peninsula stops would lengthen the trip only slightly, due to the quick acceleration and deceleration capabilities of the technology. This is one of the greatest advantages of traditional commuter rail technology over a system such as BART that provides strictly local service (trains make all stops on the line).

Another benefit of high-speed rail, as well as Caltrain electrification, is the improved traffic flow across the rail right-of-way due to full grade separation of the corridor. With the help of State and federal funds, local communities would finally be able to enjoy long-awaited grade separations that are not presently feasible due to limited local resources. Full grade separation would also improve pedestrian and bicycle safety by eliminating unsafe "informal" crossings, as well as reducing noise by eliminating the need for loud train whistles at grade crossings.

In addition to improved service, the County could enjoy significant economic benefits as train ridership increases. Peninsula stations would become vibrant activity centers within walking distance of shops, theaters, and other commercial and cultural destinations. This increased activity, with appropriate station-oriented development, could be translated into increased sales tax revenues and property values.

However, high-speed rail could also have some negative impacts. First of all, the construction of the system will be a massive undertaking with serious potential for disruption from noise, dust, vibration, and street closures. The system would substantially change the visual character of the rail corridor, by adding numerous underpasses and overpasses, overhead electrical lines, protective fencing, and large parking facilities. In addition, train frequency would be greatly increased over current levels, with associated increases in traffic around stations and noise from passing trains (although electric locomotives run quieter than diesel ones). Communities along the rail corridor would have to weigh these impacts against the benefits of greatly improved public transportation. If high-speed rail is used as a commuter service from the Central Valley to Silicon Valley, it could encourage urban sprawl.

2. *Coordination of Caltrain and High-Speed Rail Projects*

There are many opportunities for Caltrain to coordinate its infrastructure improvements with the CHSRA. Following are some of the most critical issues that the two agencies must address in order to make high-speed rail service a reality on the Peninsula.

a. *Track/Signal System Upgrades*

The JPB considers replacement and rehabilitation of the JPB tracks and signal system to be the highest priorities among a long list of capital improvements laid out in the Caltrain Rapid Rail Study. This work will most likely proceed and reach completion long before work on the high-speed rail project begins. In order to use public funds most efficiently, and avoid unnecessary service disruption from future construction, the JPB should ensure that its upgraded track and signal system will be compatible with high-speed rail operations.

Careful coordination between the two agencies is critical to providing sufficient capacity along the corridor to accommodate the greatly increased frequency of service that high-speed rail would bring. As Caltrain's ridership continues to increase, it will purchase more trains and provide more frequent service. While the Rapid Rail Study takes this increased "congestion" of the corridor into account, it does not appear to consider the possible addition of high-speed service. Safe, seamless operation of both types of service will be impossible without adequate

track capacity; third and fourth tracks along much of the corridor would be required to allow efficient blending of the two services. However, if development of the Caltrain corridor over the next decade is such that the right-of-way becomes too narrow or too built-up to allow this added capacity, then high-speed service to the Bay Area may have to utilize a less restricted corridor such as the East Bay.

The JPB should also consider how it would electrify the Caltrain corridor in the future without having to reconstruct infrastructure that is currently being rehabilitated. For example, the JPB is currently upgrading its tracks through the San Francisco tunnels. Electrification would require lowering the road bed in some of the tunnels to provide additional vertical clearance for overhead electrical lines. Rather than waiting for electrification to begin, and then tearing up brand-new sections of track, the JPB should consider lowering the road bed in these tunnels now, as part of its current track replacement work.

b. Grade Separations

Rather than undertake a large number of new grade separation projects on its own, the JPB and cities should consider waiting until high-speed rail has been funded, and come to an agreement as to how the two agencies could share the substantial costs of these projects. High-speed rail must be totally grade-separated and fenced off, as should Caltrain if it pursues electrification, and the magnitude of such a project warrants that the two agencies seek as much coordination and sharing of resources as possible. Grade separations that the JPB carries out on its own should continue to be built wide enough to accommodate the extra tracks that high-speed service will require. And, grade separations should minimize any negative impacts on surrounding land uses.

c. Station Upgrades

As the JPB renovates and redesigns many of its stations over the next several years, it should consider how high-speed rail service might be able to use the same facilities with minimal modifications. The tentative route adopted by the California High-Speed Rail Authority includes two Peninsula stops, at Redwood City and at San Francisco International Airport. The Authority should ideally review JPB plans for these stations

and suggest any changes that would minimize future modifications. Areas to consider include intermodal connections, platform design, pedestrian access, parking, and amenities.

d. Downtown San Francisco Extension

The JPB is working cooperatively with the City and County of San Francisco to complete the Final Environmental Impact Report for a combined Downtown Extension/Transbay Terminal/Joint Development. The CHSRA has participated in this process. While High-Speed Rail Authority staff have recommended Fourth and King as the terminus of high-speed service on the Peninsula, they acknowledge that the Transbay Terminal at First and Mission Streets may be more desirable if agreements are reached with the JPB and the City and County of San Francisco to fund the project and designate the terminal as an intermodal transit hub. Any future discussions about a downtown extension should involve close coordination between the JPB, San Francisco, MTC, high-speed rail, and other transit providers to encourage a design with maximum public benefit.

e. Environmental Analysis

The planning process for electrifying Caltrain is currently underway, and an approved environmental document is expected by the end of 2001. Given this schedule, it is not possible to coordinate for future environmental analysis that will be needed for implementing high-speed rail.

f. Conclusion

High-speed rail, if funded by the State, will be a massive project that could take up to twenty years to unfold. Nevertheless, Caltrain planners, local policy makers, and the public should keep this somewhat nebulous future scenario in mind when planning and allocating funds for current improvements to the Peninsula rail corridor. By carrying out near-term improvements in a way that facilitates the addition of high-speed rail service, San Mateo County could one day enjoy a truly world-class rail transit system that would be virtually impossible to build without State and

federal assistance. Important Caltrain improvements, however, should not be delayed or impaired because of the uncertain future of high-speed rail.

C. HIGH-SPEED RAIL POLICIES

9.1 Coordinated Planning

Ensure coordination of high-speed rail and Caltrain planning dealing with such issues as service frequency, capacity, station location and design, compatibility of technology and financial agreements. Ensure communication between JPB and High-Speed Rail Authority.

9.2 Coordination with Caltrain Improvements

Ensure that Caltrain improvements do not preclude or hinder potential development of high-speed rail in the Caltrain right-of-way and visa versa. Ensure that Caltrain improvements will be compatible with high-speed rail operations.

9.3 Cost Sharing of Caltrain and High-Speed Rail Improvements

Identify opportunities where the costs of high-speed rail and Caltrain improvements could be shared (i.e.: grade separations, downtown San Francisco extension).

9.4 High-Speed Rail Commute Service

Explore opportunities for coordinating high-speed rail and Caltrain services whereby high-speed rail could provide fast commute service for Caltrain patrons and Caltrain could function as a collector system to high-speed rail.

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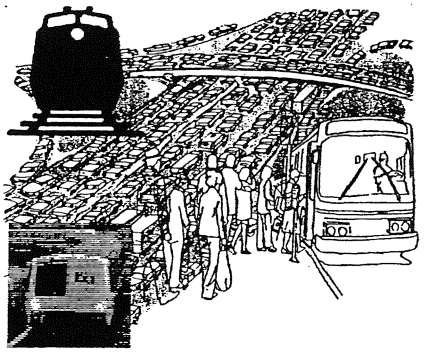
Chapter 10

CalTrain



X. CALTRAIN

A. BACKGROUND

1. Introduction

Caltrain is a commuter rail service that currently operates 78 diesel-powered trains every weekday between San Francisco and San Jose, with eight of those also serving Gilroy. The Caltrain line extends 77 miles from San Francisco in the north to Gilroy in the south. The 51-mile mainline portion of track between San Francisco and downtown San Jose is owned by the Peninsula Corridor Joint Powers Board (JPB), which purchased the track from the Southern Pacific Railroad in 1991. The portion of the line between San Jose and Gilroy is owned by the Union Pacific Railroad, which has an operating agreement with the JPB for the use of this facility. Rolling stock and other non-track assets were purchased from the State Department of Transportation (CalTrans) in 1992. The Caltrain system also includes 33 stations, 14 in San Mateo County.

Passenger rail service on the Peninsula began in 1863 and played a vital role in the early development of San Mateo County. The original rail line was a private enterprise that followed the same route through the North County as the Millbrae BART extension, until 1907, when the Bayshore cutoff was completed east of San Bruno Mountain. With the increase of automobile use in the twenties and thirties, the dominance of the railroad began to fade. This trend, accelerated by freeway construction in the fifties and sixties, continued until 1980, when train ridership fell to such a low level that Southern Pacific threatened to discontinue passenger service on the Peninsula. At this point CalTrans assumed financial responsibility for the service, contracting with Southern Pacific to continue operations.

In 1992, with the prospect of discontinued service looming again, the counties of San Francisco, San Mateo, and Santa Clara formed the JPB to assume responsibility for the rail corridor. Under the Joint Powers Agreement, a Board of Directors governs the JPB using funds from each of the three partner counties, as well as state and federal subsidies. The JPB has contracted with the staff of SamTrans to perform planning, finance, and administrative functions. In addition, the JPB contracts with Amtrak to staff operating responsibilities. Caltrain does not have a stable dedicated revenue source such as an assessment district (which funds BART) or the ability to release bonds (which finance capital improvements at ports or airports). Instead, Caltrain relies on fare box revenue

to address a portion of its operating costs, and federal and state grants along with local matching funds for capital improvement and investment.

2. *Strategic Plan*

Caltrain is currently experiencing a resurgence in ridership and investment under its new operating and ownership entities. The JPB uses two planning documents to guide this investment: the 20-year Strategic Plan, released in October 1997, and the Rapid Rail Study, released in October 1998. The Strategic Plan established five goals to inform investment decisions: (1) improve customer service and safety; (2) attain ridership growth; (3) achieve financial stability and member agency commitment to the future; (4) develop regional partnerships to establish multi-modal linkages throughout the Bay Area and beyond; (5) serve local needs and support livable communities by linking land use and transportation decisions. The plan also outlined a number of short-, mid- and long-term improvements that support these goals (see attached table).

3. *Rapid Rail Study*

The second document, the Rapid Rail Study, assessed the degree to which various proposed capital improvements would meet the goals of the Strategic Plan, and prioritized these improvements accordingly. The recommended top priority was rehabilitation of the existing tracks and signaling system, which are in a poor state of repair and will hamper future service if they are not upgraded. In addition to increasing passenger safety, rehabilitation projects would allow trains to run about 6 percent faster. The second priority recommended by the study was enhancements to improve the quality and flexibility of service. These projects include addition of third track sections to allow more express service, reconfiguration of tracks at key stations to increase efficiency and reduce turnaround times, and various station improvements including ADA accessibility and increased parking.

The study initially recommended upgrading the line from diesel to electric propulsion as the third priority. If electrification were completed after the rehabilitation and enhancement projects, run times would be reduced by 21 percent, compared with a 6 percent reduction if it were completed first. The final priority recommended was expansion projects, such as an East Bay connection via the Dumbarton rail corridor, a connection to the new light rail system at San

Francisco International Airport, and $590 million worth of grade separation projects. Reflecting these priorities, the study proposed a capital improvement program with $549 million worth of projects from the first three priorities (only engineering work would be completed on electrification). In May 1999, the JPB directors voted to adopt the Rapid Rail Study, selecting rehabilitation, and electrification as equal priorities.

4. Linked Trips

Apart from personal automobiles, Caltrain passengers depend on numerous other transit systems and conveyances to initiate and complete their trips. The most important transfer point is the San Francisco terminal at Fourth and King streets, where thousands of passengers transfer every morning to a number of bus lines, private shuttles or taxis, and the recently completed Muni Metro line. In Santa Clara County, passengers can transfer to light rail at Tamien, and starting in December, at Mountain View. Many stations on the line offer regular bus service. Many commuters rely on employer-sponsored shuttles for the trip from Caltrain to work. These services provide a vital link between the booming industrial corridor east of Highway 101 and the Caltrain line.

5. Planned Improvements

a. Caltrain Express (Baby Bullet)

This project will allow Caltrain to improve and expand its express train service. Passing tracks will be constructed in strategically located areas, stations modified and new rolling stock purchased. These improvements will allow express trains to travel at speeds of 79 miles per hour and thus substantially reduce travel times. Reductions in travel times will substantially increase ridership.

Express service will be developed in conjunction with the planned Centralized Traffic Control (CTC) project, which includes installation of a new control system and high speed crossovers on 40 miles of track. Installation of the CTC will enable Caltrain to improve safety, system reliability, train frequency and train speed. Express service will also be designed to meet the requirements of future electrification and other ongoing capital projects.

b. Electrification

Electrification will require: (1) conversion of diesel-hauled to electric-hauled trains and (2) installation of 150 to 170 single track miles of a overhead contact system (OCS) for distributing electrical power to rolling stock.

The overhead contact system (OCS) will consist of a messenger wire and a contact wire above each track in a catenary configuration. The pantograph, mounted on top of the electric vehicles, will slide under the contact wire and collect traction current. The contract wire height will vary from 19 feet to 24 feet. Hinged cantilever bracket arms, reaching out from steel poles over the tracks, will support the catenary wires.

Substation units will provide power to the wires. Two options are under consideration. The Direct Center Feed Power System option will require five substations every 13 to 19 miles apart. 25kV parallel feeders may be required at selected locations to fortify the electrical system. The Auto-Transformer Feed Power System option will require three primary substations every 29 to 37 miles apart. Ten intermediate auto-transforming paralleling stations will be placed every three to eight miles.

There are two rolling stock options. In the first option, electric would replace diesel locomotives and haul the existing fleet of gallery cars. The second option, electric multiple unit (EMU) rolling stock, would replace either all or most of the existing fleet with cars that have their own motors.

B. ISSUES

1. Service Levels

The Travel Demand Forecasting model shows that of all potential Caltrain improvements reducing run times by 25 percent increases ridership by far the most. The number of trips increases by 6660 or 18 percent. In contrast, increasing the number of trains from 60 to 86 per day increases trips by 2290 or 7 percent. The model projected ridership assuming uncontrained parking at stations.

2. Capital Improvement Programs

a. Need to Reconcile Differences Between 20-Year Strategic Plan and Rapid Rail Study

The 20-year Strategic Plan ($1.3 billion capital plan) and the Rapid Rail Study ($862 million capital plan) have made a number of recommendations on the formation of capital improvement plans. The two planning documents overlap, but they do not contain all of the same components, because the Rapid Rail study focuses on those capital improvements which would increase the speed of trains, while the Strategic Plan looks at a more comprehensive set of improvements. Thus, the Strategic Plan includes a capital plan for rolling stock and station access, whereas the Rapid Rail Plan does not because these component do not increase speeds. On the other hand, the Rapid Rail Plan includes a plan for electrification, whereas the Strategic Plan does not because electrification was simply not considered as a component of capital plan in 1997.

The JPB needs to develop a new Capital Improvement Program that reconciles the differences between the two documents. And the new CIP needs to consider that high speed rail may or may not be built in the Caltrain right-of-way. The best way to address this uncertainty is to develop a short-term plan (10-15 years) for the near future without high speed rail and a long-term plan (15 years or more) for the distant future with high speed rail. The JPB needs to recognize that in the short-term many improvements need to be made to increase service and speeds such as track rehabilitation, but they must be compatible with potential high speed rail requirements. On the other hand, the JPB needs to recognize that in the long-term there may be opportunities where the costs of high-speed rail and Caltrain improvements such as electrification and grade separations could be efficiently shared. Above all, the JPB must develop a CIP that minimizes the need to replace or redesign short-term improvements to accommodate the long-term improvements needed for two transit modes operating in the same right-of-way.

b. Need to Develop Short-Term and Long-Term Capital Improvement Programs

The JPB needs to determine which improvements in the short-term would not preclude high speed rail and at the same time meet the overall goal of significantly increasing transit ridership in order to reduce congestion. It appears that two types of improvements meet these requirements: (1) rehabilitation, and (2) electrification. Rehabilitation improvements include signal, track, and structural replacements. Enhancements improvements include third track, station improvements, increases in automobile and bicycle parking facilities, and better access to stations. Electrification improvements include: (1) overhead contact system (OCS), (2) electric locamotives or electrical multiple unit (EMU) cars, and (3) substation units.

3. Origin and Destination Stations

The function that a station serves, origin, destination or both, determines what types of improvements are most appropriate. Origin stations should serve the beginning morning commute. The most appropriate types of improvements are: (1) convenient automobile, bus, and bicycle access, (2) supplies of automobile and bicycle facilities which meet demand, (3) safe and convenient shelter, and (4) ticketing facilities. On the other hand, the most appropriate improvements for destination stations that serve the ending morning commute are providing convenient light rail, bus, and shuttle connections to employment sites and encouraging land use policies which locate as much new employment development along or near the Caltrain corridor as feasible. Studies have shown that transit best serves concentrated job centers.

The Travel Demand Forecasting Model shows that in 2010 53 percent of all Caltrain work trips will originate in San Mateo County, while only 15 percent will end here. In contrast, only 3 percent of Caltrain work trips will originate in San Francisco, while 59 percent will end there. San Francisco has historically been the major destination for Caltrain riders, and it will continue to be so in the future.

In order to increase San Mateo County as a destination on Caltrain, better linkages to employment sites are essential. Good bus and shuttle connections are critically important. As well, the development of concentrated employment

sites along the Caltrain corridor would also make San Mateo County more of a destination on Caltrain.

4. Cost Sharing

The JPB's cost sharing formula for operating expenses is based on each County's percentage of total morning boardings. This approach, which is based only on trip origins, should also include trip destinations in order to reflect the total amount of usage of the Caltrain system in each County. San Francisco, for instance, is projected to generate only 974 trip origins in 2010, but it will generate 17,406 trip destinations in the morning which is 60 percent of all work destinations on Caltrain. San Francisco will account for 31 percent of total system usage in 2010. San Mateo will account for 34 percent and Santa Clara 35 in 2010. San Francisco benefits greatly from the Caltrain system, because it makes Downtown very accessible to employees from San Mateo County, reduces congestion on San Francisco streets, creates a stronger employment base, generates taxes, and sustains San Francisco as a major city in the Bay Area. Thus, the cost sharing formula needs to reflect total usage of Caltrain stations in each county, not just trip origins.

C. POLICIES

GENERAL PLANNING POLICIES

10.1 First-Class System

Develop Caltrain into a first-class rail system for the 21st Century.

10.2 Market Demand

Develop the Caltrain system with the principal objective of maximizing ridership.

10.3 Optimal Development

Develop the Caltrain system to optimal, not necessarily maximum levels.

SERVICE LEVEL POLICIES

10.4 Policy Resolution

Recommend that the Joint Powers Board and the Transportation Authority resolve policy differences for Caltrain improvements.

10.5 Express Trains

Invest in increasing the number of express trains per day which reduce run times in order to maximize ridership.

10.6 Peak Hour Capacity

Increase capacity at peak hours.

CAPITAL IMPROVEMENT POLICIES

10.7 Short- and Long-Term CIP's

a. Develop short-term (10-year) and long-term (20-year) capital improvement programs. Develop the short-term CIP so that it: (1) considers the potential development of high speed rail in the Caltrain right-of-way, (2) recognizes opportunities where the costs of high speed rail and Caltrain improvements could be efficiently shared, and (3) minimizes the need to have to replace or redesign improvements to accommodate the potential operation of the two transit modes in the same right-of-way.

b. Develop a long-term CIP for the ultimate development of Caltrain as: (1) the only transit mode within its own right-of-way, or (2) a transit mode that shares its right-of-way with either High Speed Rail or BART.

10.8 Run Time Reductions

Fund capital improvements that result in faster run times.

10.9 Capital Improvement Priorities

Give top priority to rehabilitation and electrification according to JPB policy.

ORIGIN AND DESTINATION POLICIES

10.10 Improvements for Origin Stations (Access)

Fund improvements at San Mateo and Santa Clara County stations which stimulate ridership and maximize services to beginning morning commute trips such as the provision of: (1) convenient automobile, bus, bicycle, and pedestrian access; (2) adequate supplies of automobile and bicycle parking facilities which meet demand; (3) safe and convenient shelter; (4) ticketing facilities; and (5) restrooms.

10.11 Improvements for Destination Stations

Fund improvements at San Francisco and Santa Clara County stations which maximize ridership and services to ending commute morning trips such as: (1) providing convenient light rail, bus, and shuttle connections to employment sites, and (2) locating as much new employment development along or near the Caltrain corridor as feasible.

10.12 Improvements to Destination Stations in San Mateo County

In order to increase the percentage of Caltrain work trips that end in San Mateo County, fund improvements such as (1) light rail, bus, and shuttle connections to employment sites, and (2) locate as much new employment development along the Caltrain corridor as feasible.

FINANCIAL POLICIES

10.13 Calculation of Shares of Operating Costs

Recalculate each County's share of operating costs.

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CalTrain Work Trips

County to County
Origins and Destinations
1990 and 2010 (Alt. 2e)

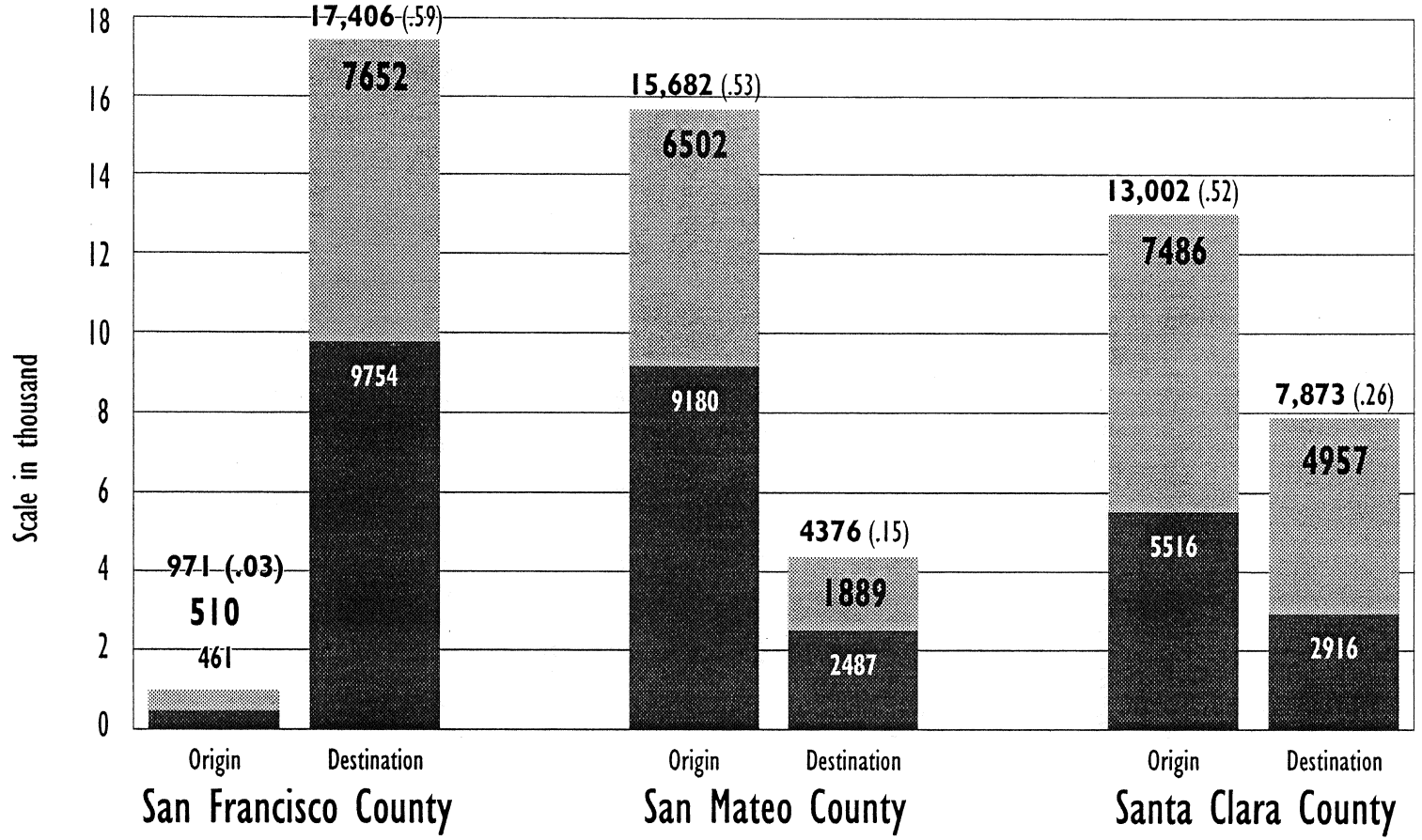

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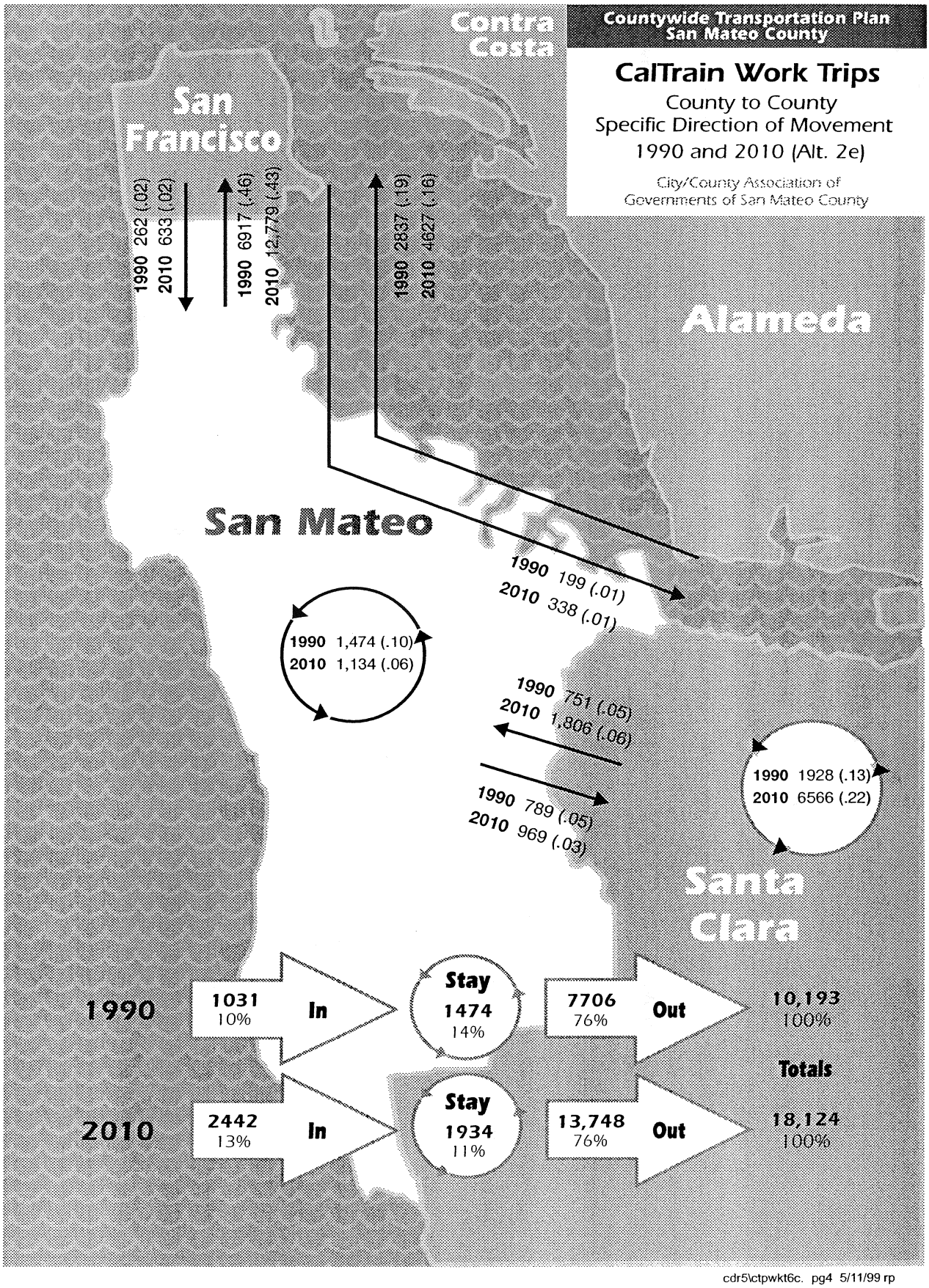
Exhibit 10.2



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CalTrain Work Trips

County to County
Specific Direction of Movement
1990 and 2010 (Alt. 2e)

Direction of Movement	1990	2010	Change	% of Growth
San Francisco County to San Mateo County	262 (.02)	633 (.02)	371	(.03)
San Francisco County to Santa Clara County	199 (.01)	338 (.01)	139	(.01)
San Mateo County to San Francisco County	6917 (.46) [1]	12,779 (.43) [1]	5862 [1]	(.40) [1]
San Mateo County to Santa Clara County	789 (.05)	969 (.03)	180	(.01)
San Mateo County to San Mateo County	1474 (.10)	1934 (.06)	460	(.03)
Santa Clara County to San Francisco County	2837 (.19) [2]	4627 (.16)	1790	(.12)
Santa Clara County to San Mateo County	751 (.05)	1809 (.06) [2]	1058 [2]	(.07) [2]
Santa Clara County to Santa Clara County	1928 (.13)	6566 (.22)	4638	(.32)
Total	**15,157 (1.00)**	**29,655 (1.00)**	**14,498**	**(1.00)**

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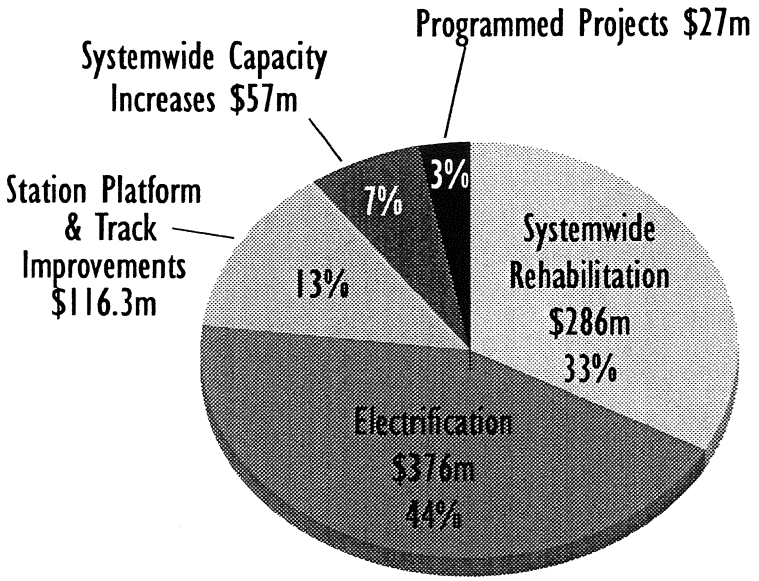
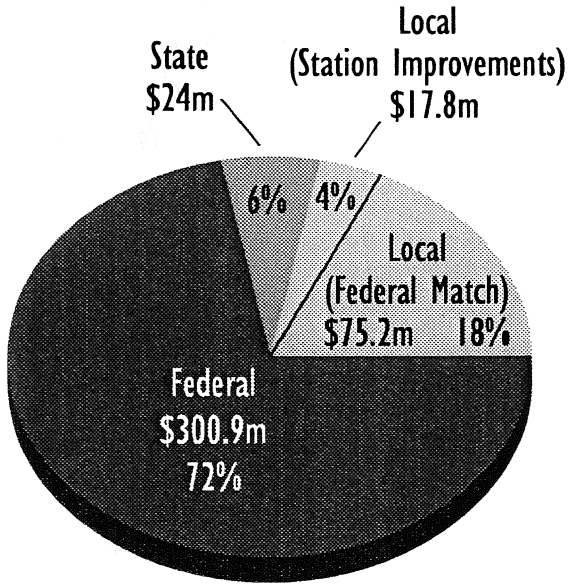
Exhibit 10.4

Countywide Transportation Plan

CalTrain Rapid Rail Plan
Potential Funding Sources 2000 - 2009
(Three Counties)



Capital Improvement Plan $862.3m



Potential Funding Sources $417.9m

Shortfall

$862.3m	Capital Improvement Plan
- 417.9m	Potential Funding Sources
$444.4m	

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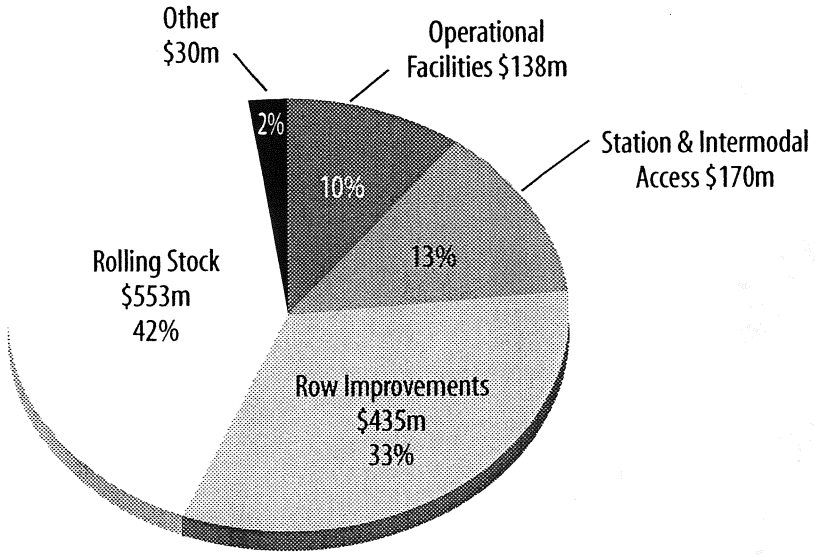
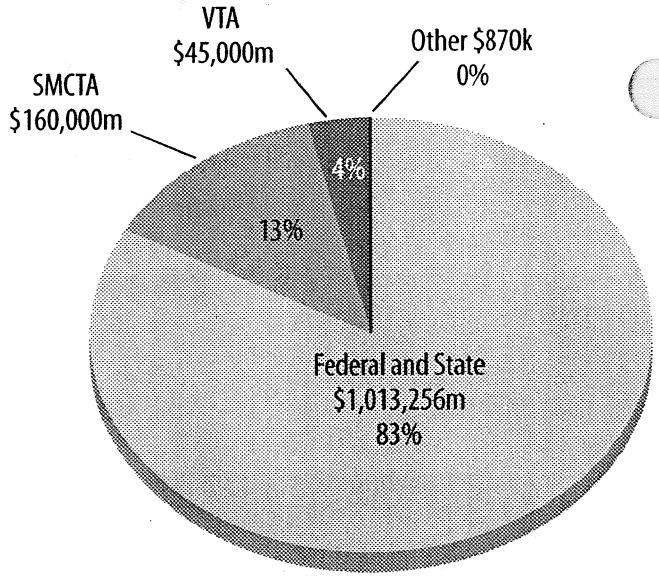
CalTrain 20-Year Capital Improvement Program
Potential Funding Sources
1997-2017



Capital Improvement Plan
$1,325m



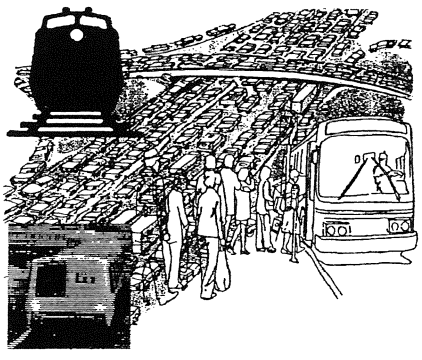
Potential Funding Sources
$1,219m

Shortfall

$1,325m	Capital Improvement Plan
- 1,219m	Potential Funding Sources
$ 106m	

Chapter 11

BART



XI. BART

A. Background

Despite numerous financial and political obstacles, the extension of BART from Daly City to San Francisco International Airport has been considered a high priority ever since the system opened in 1972. During the last decade, these obstacles have finally been removed, and in 2002, BART trains will begin serving four new stations in San Mateo County. These stations are South San Francisco, San Bruno, San Francisco International Airport, and Millbrae. Perhaps most importantly, the SFO extension will link the BART and Caltrain systems at the Millbrae intermodal station, effectively creating a 180-mile regional rail system.

1. Physical Description

The 8.7-mile extension alignment begins in Colma and moves south through South San Francisco and San Bruno, using an abandoned railroad right-of-way. Just south of Interstate 380, the alignment enters the Caltrain right-of-way, running alongside the Caltrain tracks through Millbrae and into Burlingame. An aerial wye stub, 1.2 miles long, connects this alignment to the airport station. 6.5 miles of the alignment will be subway, 1.2 miles will be aerial, and 1 mile will be at-grade. Like the rest of the BART system, the extension will be double-track, electrified, and computer-controlled.

2. Financing

The $1.5-billion project is being financed primarily with federal funds. BART has a $750 million full funding agreement with the Federal Transportation Authority. The project is also receiving $99 million from SamTrans, $108 million from the California Transportation Commission, $10 million from the Metropolitan Transportation Commission, and up to $200 million from San Francisco International Airport.

3. Project Benefits

The BART-SFO extension provides a direct rapid transit connection to San Francisco International Airport, the world's seventh busiest airport and a major source of traffic congestion on the Peninsula. The project will eliminate 10,000 daily auto trips to the airport, and 4 percent of all daily auto work trips in San Mateo County. BART ridership in the County will double to 64,000, and total transit trips will increase by 32 percent to 116,000. The reduction in auto travel will have a positive impact on regional traffic congestion, fuel consumption and air pollution. The new stations could encourage new transit-oriented development in the host cities. The project will also generate thousands of new jobs.

B. ISSUES

1. Southward Extension of BART from Millbrae

Upon completion of the SFO extension project, BART will be in an ideal position to move farther south in the Caltrain right-of-way, provided that immense political and financial obstacles are removed. An important question is how far south BART would logically move. There are two potential scenarios. One would have BART going to the Menlo Park/Palo Alto area, which is a prime destination for many residents in the areas that BART currently serves. This would probably require San Mateo County to buy in to the BART district. The second scenario would have BART continuing to San Jose, where it might connect with another BART extension from Fremont and form a continuous ring around the Bay. Downtown San Jose is a logical southern terminal, because it is already a transit hub for the South Bay, and it is experiencing growth in jobs and high-density housing. The second scenario would probably require both San Mateo and Santa Clara counties to buy in to the BART district.

There are two potential alignments for a Peninsula BART extension: the Caltrain right-of-way, and U.S. Highway 101. Within the Caltrain alignment, subway construction would probably be used for much of the project to minimize noise and aesthetic impacts, as on the SFO extension. This would also greatly increase the expense of the project. Within the Highway 101 alignment, aerial structures in the highway's median would have the least effect of reducing the capacity and operational efficiency of the highway. Using the Caltrain right-of-way would allow BART to serve the established downtown areas of Peninsula

cities, where existing land uses are more likely to support a transit station. Using Highway 101 would allow BART to better serve the growing employment centers located east of the highway, such as South San Francisco, Foster City, Redwood Shores, and East Palo Alto. However, stations in the Highway 101 alignment would be harder to access for most Peninsula residents than stations in the Caltrain right-of-way, especially for those without private cars.

a. Disadvantages

There are many disadvantages associated with another BART extension, besides the high cost. First, BART speeds would be slower than electrified Caltrain speeds. An electrified Caltrain would have a top speed of 90 mph, while BART's top speed is 75 mph. Second, BART would make fewer stops on the Peninsula than Caltrain, meaning that fewer jobs and housing units would be located within walking distance of a station. Third, BART trains would have to stop at every station, and would not have the ability to operate as express trains by skipping stations. Fourth, BART has a lower capacity (passengers per train) than Caltrain. Fifth, it would be more difficult and more expensive to extend BART along the Dumbarton corridor or to Gilroy. Sixth, there would be significant competition for funds because of potential extension to San Jose and cities in Contra Costa County.

A key advantage of Caltrain "commuter rail" over BART is that it can use common, inexpensive rail technology with similar or superior results. This leaves more options open for future rail service, such as running Altamont Commuter Express trains from the Central Valley to San Francisco, extending Caltrain service south to Hollister or Monterey County, or building a transbay rail link between the Caltrain terminal in San Francisco and conventional East Bay rail lines. Sixth, construction of a BART extension would have tremendous impacts. If built in the Caltrain right-of-way, BART construction would hamper existing Caltrain service by forcing slower train speeds and making station access and boarding more difficult. In addition, much of the work that is currently underway to upgrade Caltrain would be wasted. New tracks and station platforms would have to be removed to make way for BART. If built along Highway 101, BART construction would temporarily reduce the highway's capacity by closing lanes.

b. Advantages

However, there are some advantages of another BART extension. Perhaps the most obvious is that passengers traveling between the East Bay or San Francisco and the Peninsula would minimize transfers between transit systems to reach their destinations. A BART extension would bring the Bay Area closer to having a single transit system that serves all of the major population centers in the region, making ticketing and coordination with other transit providers easier. Second, a BART extension would be totally grade separated, meaning far less potential for accidents involving autos and pedestrians. Third, BART is more accessible to persons with disabilities and those traveling with luggage, small children or other burdens. Fourth, BART's computer-controlled trains are less susceptible to mechanical failure than Caltrain's diesel or potentially electrified locomotives.

One of the most important issues in evaluating further BART extension is the congestion reduction benefit and its cost-efficiency. The reduction in auto travel that a BART extension would bring needs to be compared to the reduction that would result from a fully upgraded and electrified Caltrain system. Until these data are available, the merits of further BART extension cannot be effectively assessed.

2. Cost of BART Extension

Depending on project design specifics, the cost of a BART extension could be up to seven times greater than the full package of Caltrain Rapid Rail upgrades. One element of project design that greatly influences cost is the type of line construction. There are four potential types of BART line construction: subway, aerial structure, retained fill, and at-grade. The most expensive type of construction is subway, which is generally 10 to 11 times more costly than at-grade construction, the least costly type. A 1998 SAMCEDA study of BART extension alternatives estimated unloaded subway construction costs within the Caltrain corridor at about $58 million per mile. Because of their high cost, subways are generally only built in dense urban areas or where necessary to minimize noise and aesthetic impacts.

For aerial structures (i.e., elevated guideways) the cost is generally 3 to 4 times the at-grade cost. The SAMCEDA study estimated the cost of an aerial structure in the Highway 101 median at about $22.7 million per mile. Like subway construction, aerial structures have the advantage of avoiding all grade crossings, but at a much lower cost than subways. In addition, aerial structures allow passengers to enjoy outstanding views. However, they are also the most visually obtrusive of the three types. Similar to aerial structures is retained fill construction. This type is essentially what was used on Caltrain's Belmont/San Carlos grade separation project. The SAMCEDA study estimated the cost of retained fill construction in the Caltrain right-of-way at $15.8 million per mile. Retained fill also simplifies grade separations. The least expensive construction type is at-grade. However, at-grade tracks require more expensive grade separations, since intersecting roadways must either be elevated above or depressed below the tracks. For this reason, most of the existing BART system is on aerial structures.

It is important to note that construction is not necessarily limited to one type for the entire length of the extension. For example, the SFO extension is mainly subway, but has a 1.2-mile section of aerial structure on the approach to the airport. The type of construction selected for a given segment of an extension depends heavily on surrounding land uses. In industrial areas, for example, there is less concern about noise and visual impacts, and aerial or at-grade construction is more acceptable to local communities. Land uses along Highway 101 tend to be industrial, while along the Caltrain right-of-way they are more likely to be residential. In addition, because of the existing vehicular noise, the addition of BART service to Highway 101 would probably not result in a significant noise increase. For these reasons, a BART extension in the Highway 101 alignment would probably be less costly than in the Caltrain right-of-way.

Extending BART in the Caltrain right-of-way would be more difficult and costly than in the Highway 101 alignment, mainly because of the environmental impacts on neighboring communities and the need to build next to an operating railroad. One of the reasons BART is building a subway for most of the SFO extension is because the cities and property owners along the extension alignment demanded it to mitigate noise and visual impacts. One can safely assume that jurisdictions such as Burlingame, Atherton, Menlo Park, and Palo Alto will have enough political leverage to require subway construction within their boundaries. However, as stated above, if there is to be only one rail transit system on the Peninsula, then running BART in the Caltrain right-of-way makes more sense from a land use planning perspective, since the established downtown areas

along the Caltrain corridor are better suited for supporting transit stations. These areas have better pedestrian access and transit connections, more evening and nighttime activity, and more high-density housing. Therefore, extending BART down the Peninsula involves a trade-off between cost and good transit-oriented land use planning.

In addition to the line construction, an estimate of a project's total cost should include stations, parking, yards, systems, engineering, construction management, administration, right-of-way acquisitions, and vehicle costs. The SAMCEDA study prepared very rough cost estimates (error range of -20% to +40%) of BART extensions to Menlo Park in both the Highway 101 and Caltrain alignments. The Highway 101 alignment was estimated to cost $1.4 billion, while the Caltrain alignment was estimated to cost $1.7 billion. Neither estimate includes right-of-way costs, which could range from $100 million to $300 million. Applying the same rough estimates for a San Jose extension yields the following costs: $2.7 billion in the Highway 101 alignment and about $3.6 billion on the Caltrain alignment.

Staff believes that the SAMCEDA estimates, especially for the Caltrain corridor, could be severely under actual costs. The Caltrain corridor estimate assumes less than two miles of subway construction, when in reality much more subway would probably be required by cities on the alignment. A more realistic estimate would take into account the cost that BART is incurring on the SFO extension ($170 million per mile). A BART extension in the Caltrain right-of-way would probably be very similar to much of the SFO extension. At $170 million per mile, a BART extension to Menlo Park in the Caltrain right-of-way would cost roughly $2.9 billion, and an extension to downtown San Jose would cost roughly $5.9 billion. Staff believes SAMCEDA's estimate for the Highway 101 alignment would also be much lower than actual costs, because it does not take into account the need to widen the highway at and around the BART stations. In addition, extensions into San Mateo County would also require investments in the core system.

The following table summarizes the estimated BART costs discussed above:

ESTIMATED BART EXTENSION COSTS		
BART Destination/Alignment	**SAMCEDA Estimate**	**Staff Estimate Based on SFO Cost**
Menlo Park/Highway 101	$1.4 billion	N/A
Menlo Park/Caltrain right-of-way	$1.7 billion	$2.9 billion
San Jose/Highway 101	$2.7 billion*	N/A
San Jose/Caltrain right-of-way	$3.6 billion*	$5.9 billion
*Interpolations based on SAMCEDA's Menlo Park estimates.		

In comparison to these BART costs, it will cost about $862 million for the full package of Rapid Rail upgrades to Caltrain, including electrification. The cost per mile of this work would be about $11.2 million, or about 7 percent of BART's per-mile SFO cost. Using the SFO costs, a BART extension to San Jose would cost roughly 7 times more than the Caltrain Rapid Rail program, but would offer fewer stations, no express service, and less opportunity for future expansion.

3. *BART/Caltrain Operational Considerations*

If BART were extended farther south in the Caltrain right-of-way, one of the most important issues would be the relationship between BART and Caltrain. From an efficiency standpoint, it would make little sense for the two services to run side-by-side all the way down the Peninsula. However, if they did, all BART stations should be intermodal to allow cross-platform transfers to Caltrain. This would give passengers greater flexibility in reaching the station nearest their destination. In addition, there should be close coordination between the ticketing operations of the two systems, to facilitate transfers. Schedules should be coordinated as well, so that BART and Caltrain trains arrive simultaneously at intermodal stations.

The CTP Transit chapter assesses the various potential components and combinations of bus, rail, and ferry service in San Mateo County that could form a comprehensive transit system for the 21st century. Following is a brief analysis of the four CTP transit system alternatives that include a San Jose BART extension. During the next two years staff will analyze the feasibility of each alternative, forecast travel demand, estimate costs and conduct cost benefit analyses.

a. Alternative 4

In this alternative, BART runs down Highway 101 to San Jose, while Caltrain shares its right-of-way with High-Speed Rail. This alternative offers numerous transit options to Peninsula commuters. By running down Highway 101, BART serves the growing employment centers east of the highway, while Caltrain serves the established downtown areas. However, the capital and operating costs of this alternative are almost certainly prohibitive.

b. Alternative 5

This alternative replaces Caltrain with BART, which would share the Caltrain right-of-way with High-Speed Rail. It does not serve the east-of-101 employment areas as well as Alternative 4. The advantages and disadvantages of BART vs. Caltrain, as discussed above, apply here. High-speed rail service would possibly compensate for the loss of Caltrain express service.

c. Alternative 6

This alternative maintains Caltrain service and extends BART to San Jose within the Caltrain right-of-way. The cost would be high, and the benefit very low due the fact that the BART extension would not serve any new areas along the Peninsula, but would basically duplicate Caltrain service.

d. Alternative 7

This alternative replaces Caltrain with BART, which could run in either the Caltrain right-of-way or Highway 101. This alternative would result in reduced service to Peninsula commuters due to the disadvantages of BART service described above.

C. POLICIES

11.1 Analysis of Potential Alternatives

During the next two years, analyze the feasibility of potential BART extensions south of Millbrae, forecast travel demand, estimate costs, and conduct cost-benefit analyses.

11.2 Justification for a BART Extension South of Millbrae

Consider a BART extension south of Millbrae only if analysis shows that:

a. BART generates net new transit riders thereby increasing total transit trips, and

b. The number of net new riders demonstrates its cost-effectiveness using national standards.

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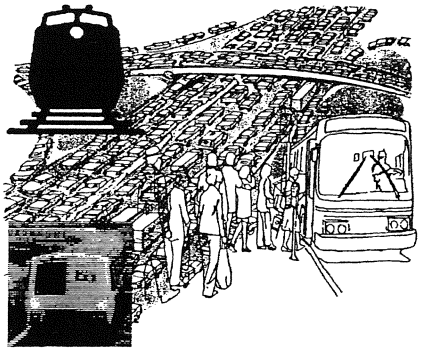
Chapter 12

SamTrans



XII. SAMTRANS

A. BACKGROUND

1. Introduction

The San Mateo County Transit District (SamTrans) was established in 1975 to oversee the bus services of 11 individual municipalities on the Peninsula. Eventually, these individual systems were combined into one bus network and new initiatives such as Express service into San Francisco were added to SamTrans' service portfolio.

Today, SamTrans operates a fixed-route bus system of 65 routes. Over 63,800 riders utilize SamTrans services on an average weekday. In addition to local bus routes, SamTrans operates express commuter service to San Francisco and the Daly City BART station. In addition to its bus service, SamTrans operates the County's paratransit service, RediWheels, and participates in the funding of shuttles linking Caltrain and San Mateo County BART stations with major employment sites throughout the County.

SamTrans is currently in the process of reorganizing its bus system for the first time since the agency's formation in the mid-1970s. The reorganization, implemented through the Bus Improvement Plan, is being undertaken with the goal of conserving valuable transportation funds by streamlining and consolidating bus service wherever possible. In addition, SamTrans will attempt to better integrate its bus service with the other two major transit providers in San Mateo County, Caltrain and BART.

2. Ridership

In Fiscal Year 2000/2001, SamTrans buses carried 59,130 average weekday riders and 17.9 million annual riders. In fiscal years 1986/1987, comparable figures were 61,076 average weekday riders and 18.3 million annual riders. As these figures demonstrate, SamTrans ridership has been holding steady over the last 10 years; however, ridership has slightly declined since it reached a high in 1991-92. This downward trend is one of the reasons SamTrans initiated its Bus Improvement Plan. A major goal of this effort is to determine which routes are inefficient outlays of service.

3. Relationship To Other Systems

Before SamTrans' formation, 11 individual small-scale transit agencies provided localized bus service to communities on the Peninsula. Those systems historically provided San Mateo County residents with three broad services: (1) localized trips from residential areas to commercial centers (shopping or work trips), (2) connections to Caltrain or BART from residential areas, and (3) express service from residential communities into the region's historical central business district, downtown San Francisco.

Today, close to 25 years after those 11 local carriers were consolidated to create SamTrans, the agency is still offering services based largely on this model. In addition to the feeder service role SamTrans plays with the County's 14 Caltrain and two BART stations, it also provides localized transit operations and express routes into downtown San Francisco. At present, SamTrans offers 55 local routes throughout the County. The agency's interregional services offer 10 separate mainline express routes into and out of San Francisco.

a. BART

SamTrans has recently completed an evaluation of its bus service in anticipation of several changes in the County's transportation system. The most significant of these changes will be the opening of the BART Millbrae/SFO extension in 2002. With the completion of that project, new BART stations will be begin serving South San Francisco, San Bruno, the San Francisco International Airport, and Millbrae. At that time there will likely be a shifting in commute patterns, especially for North County residents destined for San Francisco who will have an option of choosing BART or Caltrain. A major component of SamTrans' Bus Improvement Plan was to prepare for the extension of the BART system (see section below). SamTrans will reorganize its North County services to be compatible with new BART service.

Currently, SamTrans operates connecting service to San Mateo County's BART stations in Daly City and Colma. Bart's Daly City Station connects with six separate SamTrans lines. The Colma station connects with 11 separate lines.

b. Caltrain

In addition to the anticipated extension of BART, SamTrans expects Caltrain will continue to gain ridership as commuting patterns change and the railroad conducts its own upgrade over the coming 5-10 years. Both SamTrans and a fleet of dedicated shuttles provide connections to homes or workplaces for Caltrain riders. SamTrans buses connect to 11 of the 14 Caltrain stations in the County.

4. SamTrans Bus Improvement Plan

The goal of the SamTrans Bus Improvement Plan was to reorganize the existing bus network to make it more effective and efficient. This entails such proposals as: eliminating redundancies where two lines may serve the same routes or portions of a route; eliminating routes or stops with low or non-existent ridership; adding service to areas with greater needs; and redesigning the system to better integrate with both BART and Caltrain.

After proposing changes to routes that affect over 70 percent of SamTrans riders, SamTrans staff sought out input in a series of public meetings. Once the public comments were incorporated into the proposed system revisions, the bus network was redesigned in three phases. Phase I, implemented in August 1999, resulted in changes to key local routes as well as establishing a color coded numbering system to enhance visibility. The service plan decreased service on less-traveled routes and provided more frequent service on the most well-traveled routes in the system. The goal of Phase II is to reduce the cost to SamTrans of providing school-day service throughout the County. For example, SamTrans will explore a variety of service delivery options. Finally, Phase III will be initiated once the BART extension comes on-line and Caltrain service is upgraded, probably in 2002. At that time, SamTrans will evaluate the efficiency and possible redundancy of its express bus service.

5. Capital Program

SamTrans is responsible for funding capital expenditures related to its motorbus fleet, the RediWheels paratransit service, shuttle fleet, and the ongoing extension of BART in San Mateo County.

SamTrans has developed a Capital Improvement Program (CIP) to manage and anticipate capital expenditures over time. The CIP is funded primarily from the 1/2 cent sales tax. As a requirement of the Short Range Transit Plan, it must be submitted to the Metropolitan Transportation Commission (MTC). SamTrans revises its 10-year CIP on a biannual basis. The funding sources for each component of the CIP are varied and are made up of the same local, state, and federal programs detailed in the previous section. The CIP is fully funded.

B. ISSUES

1. Appropriate Commuter Role

Of all transit modes in the County, SamTrans currently has the highest ridership. The Travel Demand Forecasting Model projects that in 2010 it will still have the highest ridership, although the BART extension to Millbrae and Caltrain improvements will cut its share of the transit market from 57 to 41 percent. BART will have 35 percent and Caltrain 24 percent of the transit market.

BART and Caltrain serve different markets, but the primary destination for both systems is, and will be in 2010, San Francisco. BART provides short distance service to San Francisco, whereas Caltrain provides long distance service. San Francisco will be well served by both, so current SamTrans express services to San Francisco will become more and more duplicative of rail service. To avoid this competition, it would be most appropriate for SamTrans to become a feeder service to the rail systems. SamTrans could serve as a collector transit system, carrying passengers from their homes or park and ride lots to BART and Caltrain stations and maximizing ridership on the two systems.

2. Appropriate Other Roles

SamTrans serves a very large population who do not have the means or the ability to drive an automobile. Of all transit modes, SamTrans has the highest percentage of non-work trips. The Travel Demand Forecasting Model projects that in 2010, 46 percent of SamTrans trips will be non-work, compared to 31 percent for Caltrain and only five percent for BART. Clearly, SamTrans serves and will serve a large market that is not part of the commute workforce.

This is an appropriate role for a bus system to play: short trips within the County for people do not have a car and want to go shopping, to the doctor, or to school. There is a tremendous demand for this kind of service, and SamTrans is the appropriate provider. Thus, it seems that SamTrans can have two equal roles to play in the future: (1) feeder to Caltrain and BART commute systems, and (2) transit provider for the population without the means or the ability to drive an automobile.

C. POLICIES

12.1 Feeder System

a. Provide "feeder" bus service to Caltrain and BART stations and other transit terminals.

b. Continue to provide express service to cities which are not served by Caltrain or BART.

12.2 Transit-Dependent Population

Provide bus service for the transit-dependent population.

12.3 Rapid Bus Service

Explore the feasibility of developing rapid bus service.

12.4 Smart Bus Service

Explore the feasibility of developing a "Smart Bus Corridor" on El Camino Real.

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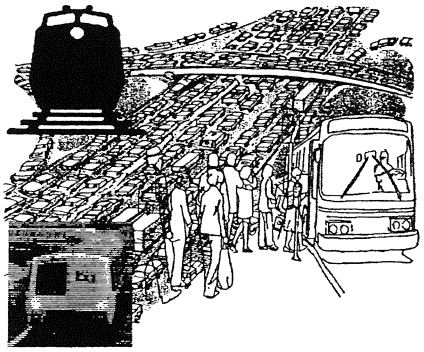
Chapter 13

Ferries



XIII. FERRIES

A. BACKGROUND

A key component of the Bay Area transportation system in the early decades of this century, ferries in their heyday carried up to 60 million passengers per year. With the construction of toll bridges in the 1930s and the rise of the automobile, ferries quickly faded from prominence and by the 1980s were carrying fewer than three million passengers per year. However, as concerns over traffic grew and Bay Area residents started looking for new ways to get people out of their cars, two events thrust ferries back into the transit spotlight. Ferry ridership increased significantly in 1989 when the Loma Prieta Earthquake forced a month long closure of the Bay Bridge, and again in 1998, when the BART strike stranded thousands of transbay commuters. Ferry ridership remained higher in the wake of these events and two ferry lines established in response to the earthquake, Vallejo to San Francisco and Oakland-Alameda to San Francisco, have prospered.

With traffic congestion now reaching crisis proportions, political and business leaders are demanding a reexamination of the feasibility of improving and/or expanding ferry service, and Bay Area residents are becoming more receptive to the notion of a waterborne commute. A December 1996 poll by the Bay Area Council (BAC), a business-sponsored public policy organization, found not only that transportation ranked as the number one concern of Bay Area residents, but also that 82 percent of residents favored expanded ferry service. Ferries are favorably viewed for their cost-effectiveness, environmental compatibility, and their ability to serve as a primary transportation mode in times of emergency.

1. Ongoing Planning Efforts

a. Bay Area Water Transit Initiative

The Bay Area Water Transit Initiative, conducted by the Bay Area Council during 1999, is the result of a California State Senate resolution directing the BAC to study expanded water transportation on San Francisco Bay. The study responds to the widely held belief that since 1992, potential ridership for expanded ferry service has increased dramatically, and therefore warrants further analysis. In particular, skyrocketing employment growth and the corresponding increases in traffic along

Highway 101 corridor justify reevaluation of potential ferry ridership in San Mateo County. Oracle Corporation, located in Redwood Shores adjacent to Highway 101, exemplifies this growth and ridership potential. The company's headquarters has grown to over 7,800 employees, an estimated 20 percent of whom commute from San Francisco.

The Water Transit Initiative charts out a bold new course for a vastly expanded and improved regional high-speed water transit system, with the desired outcome being nothing short of "the best in the world." The study sets forth the following three goals for the system: (1) improving regional mobility and relieving traffic congestion in a cost-effective manner; (2) operating in an environmentally conscious manner; and (3) supporting "smart growth" by stimulating more sustainable and efficient land use patterns in the region.

The study outlines conceptual scenarios for "critical mass" as well as "build-out" operations based on a set of performance criteria, and identifies the terminals, routes, vessel types, ticketing concepts, safety procedures, maintenance requirements, and estimated capital costs that would be part of such a system. The build-out scenario for San Mateo County envisions terminals at Oyster Point (South San Francisco), San Francisco International Airport, Coyote Point (San Mateo), Foster City, Redwood City, and East Palo Alto. Among these sites, Oyster Point and Redwood City are assigned the highest priority due to their high potential ridership and low environmental impact.

Governor Davis has signed a bill creating a Water Transit Authority to develop a detailed financial plan and analyze the environmental impacts of a new ferry system. $12 million has been appropriated for development. Early discussions have identified a $1 increase in the Bay Bridge toll as a possible source of funding. Currently, the Authority is awaiting appropriation of funds for its operating budget.

b. *MTC Regional Ferry Plan*

In 1992, the Metropolitan Transportation Commission (MTC) adopted the Regional Ferry Plan. The 1992 Study made recommendations for improving existing ferry services as well as for establishing new ferry routes throughout the bay region. It concluded that four potential new

ferry routes with San Francisco destinations merited further study: Port Sonoma/Marin, Berkeley/Albany, Martinez, and Alameda (Bay Farm Island). The study also evaluated ferry service from Redwood City and South San Francisco to San Francisco and San Leandro, but concluded that none of these was feasible due to inadequate ridership levels and potential conflicts with Caltrain. The study forecasted ridership on these routes as follows:

(1) Redwood City to San Francisco: 151 during AM peak (30 percent fare box recovery).

(2) South San Francisco to San Francisco: 155 during AM peak (32 percent fare box recovery).

(3) San Leandro to South San Francisco: 50-150 daily (10 percent fare box recovery).

(4) San Leandro to Redwood City: 50-150 daily.

This plan now has several deficiencies. It did not assume current high levels of job growth near the Port of Redwood City and realistic operating schedules. Consequently, its ridership projections and operating costs projections are out of date.

c. *MTC Regional Ferry Plan Update*

Recently, MTC completed a Regional Plan Update. The update focused on short-term improvements to existing services rather than recommending new ferry routes. While MTC acknowledges that increases in highway congestion and job growth since 1992 justify further study of ferry services in San Mateo County, the update did not analyze any such options due to limited resources.

d. *Redwood City Water Transit Services Fact-Finding Panel*

In another planning effort, the Port of Redwood City convened a Water Transit Fact-Finding Panel in the Spring of 1998 to investigate the possibility of establishing a ferry service in Redwood City, which is home

to the only deep water port in the southern portion of the Bay. Research conducted by the panel documented the substantial employment growth that has occurred in the Highway 101 corridor. For example, Seaport Centre and Pacific Shores Center at the Port of Redwood City will create 5,000 to 6,000 jobs.

Analysis indicates that the most feasible ferry service would operate between Redwood City and San Francisco, given that an estimated 10 to 15 percent of employees at the larger companies in the Highway 101 corridor live in San Francisco. In particular, a report from ten of the largest employers in the vicinity of the Port showed that nearly 2,000 employees live within 3.5 miles of the San Francisco Ferry Terminal. Additionally, a survey of Redwood City residents who work in San Francisco found that 80 percent would trade their car for a 45-minute ferry ride to the Port of San Francisco. Having identified a potential market for Redwood City ferry services, the Port is now exploring funding options. Thus far, the port has received tentative interest from two ferry operators in providing service on a trial basis.

e. *South San Francisco Water Transit Task Force*

In a similar planning effort, the City of South San Francisco, the San Mateo County Harbor District, and the Peninsula Congestion Relief Alliance have been cooperatively studying the feasibility of ferry service from the North and East Bay to the Oyster Point Marina. A ferry terminal at Oyster Point Marina has the potential to serve as a transit hub because it can be easily connected to various employers in the east of 101 area by current shuttle programs. A Water Transit Task Force, comprised of business and government leaders in northern San Mateo County, concluded that Oyster Point Marina is immediately available to deep-water vessels and is therefore an ideal location for a North County ferry terminal. The ferry service could reduce congestion in the northern portion of Highway 101, the Bay Bridge and San Mateo Bridge corridors by providing alternate ways of commuting to the City's east of 101 area. This area has a base employment of 24,000 and ABAG estimates 10,000 additional employees by the year 2020. The City and the Harbor District are currently negotiating with ferry operators for trial runs from the Oyster Point Marina to the North or East Bay.

B. ISSUES

Ferries have the potential to attract long distance commuters, provide cost-effective congestion relief and establish new transit connections with a relatively low environmental impact. In San Mateo County, they might serve large employment centers east of Highway 101 and provide a transit connection with the East and North Bay areas. However, a number of issues need to be addressed before ferry service can be established in the County. These include:

1. Competition With Other Transit Modes

Ferry service should draw most of its riders from single-occupant vehicles, rather than existing rail and bus services. A ferry route that simply transfers train passengers to ferries offers few congestion and air quality benefits, and does not warrant significant public investment. Proposed routes need to be carefully studied to determine what types of commuters they will attract. In addition, ferry service should be paid for only with new transit funds, and not by redistributing existing transit funding.

2. Connections to Ground Transport

Very few commuters will be able to walk to their jobs or homes from the ferry terminals proposed for San Mateo County. Some kind of shuttle, bus, or rail connection will be required in most cases. The delay involved in changing transit modes, and the length of the connecting trip need to be considered when forecasting demand for ferry service. In addition, the cost of providing connecting ground transportation and land site facilities must be included when estimating the cost of new ferry service. Availability of parking at the terminal site is another important concern.

3. Location of Terminals

Terminal location plays an important role in determining the success of ferry service. All of the existing ferry routes in the Bay Area serve the Ferry Building in downtown San Francisco, which is located within walking distance of thousands of jobs. Without this ideal location, ferry service would certainly be much less attractive to commuters. An important challenge in providing ferry service to San

Mateo County is that few potential terminal sites are located in close proximity to concentrated job centers. For example, Redwood Shores has a relatively high concentration of jobs; however, the nearest proposed terminal (at the Port of Redwood City) is about five miles away. Shuttles from the terminal would have to travel on a highly congested stretch of Highway 101, adding to the total trip time for ferry commuters. These factors need to be considered in evaluating the potential for ferry service.

In summary, a number of key issues regarding the feasibility of ferry service need to be addressed. Provided this occurs, ferry service should be encouraged as a component of San Mateo County's transportation system.

C. *FERRIES POLICIES*

13.1. Water Transit Studies

a. Support future travel demand studies to determine the projected demand for ferry travel to and from San Mateo County.

b. Support cost-effective ferry service that does not duplicate or compete with other transit systems.

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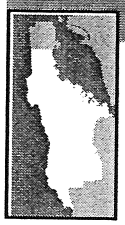
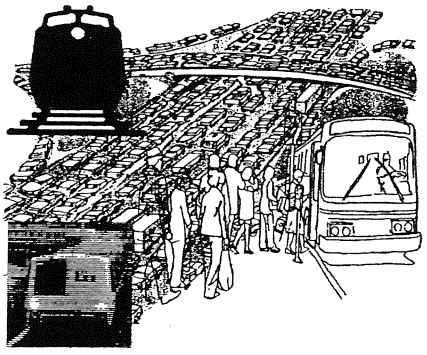


Chapter 14

Transportation Systems Management



XIV. TRANSPORTATION SYSTEM MANAGEMENT

A. BACKGROUND

Transportation System Management (TSM) generally refers to attempts to improve roadway capacity without adding additional lanes. It includes actions to influence transportation system supply in order to improve the efficiency of the existing transportation network. It also includes techniques designed to reduce demand for single-occupant vehicle trips, commonly referred to as Transportation Demand Management (TDM).

There is a significant overlap between supply- and demand-side measures because changes in supply often affect demand. Similarly, many TSM measures cross over with other policy categories and are therefore addressed in other sections. For example, improved transit service could qualify as a TDM strategy since it is aimed at reducing single-occupant vehicle trips; instead, it is addressed in the Transit Policy Section.

TSM techniques have minimal effects at reducing congestion when used individually. In particular, TDM programs have generally had limited success in decreasing VMT at the regional level, since they are typically carried out in a piecemeal manner by individual companies. TSM strategies are much more effective when used as a coordinated regionwide package of policies.

San Mateo County's Transportation System Management (TSM) Plan, adopted in 1990 and which needs updating, contains a comprehensive discussion and evaluation of the various TSM techniques that are available for addressing regional traffic congestion. The following outlines the key TSM measures the TSM Plan identified as offering the most hope for relieving traffic congestion in San Mateo County. Due to the considerable overlap between policy categories, some measures that are recommended in the TSM Plan are discussed in other policy sections.

B. ISSUES

1. Supply-Side TSM Strategies

Presented below is a discussion of supply-side approaches that can be used to promote alternatives to the single-occupant automobile. Supply-side techniques generally refer to actions that improve the existing transportation system.

a. Shuttle Buses

Caltrain and SamTrans established employee shuttle bus programs with the overall purpose of increasing Caltrain and BART ridership by providing a direct link between transit stations and employment sites. Since their inception, employee shuttle bus programs in San Mateo County have become a popular employee benefit and have more than tripled their ridership. In addition to employee shuttles, three residential shuttles to Caltrain stations will start next fiscal year.

Currently, there are nineteen employee shuttle bus programs operating in San Mateo County; thirteen shuttle bus programs serve Caltrain, and six shuttle bus programs serve BART. These employee shuttles provide service to more than 200 businesses and carry an average of 2,350 riders per weekday. Current shuttle programs are recognized by the JPB as a cost-effective method of increasing Caltrain ridership, linking 14 percent of Caltrain commuters to work sites in San Mateo County and 16 percent systemwide. The funding for the shuttles is provided by the Bay Area Air Quality Management District (BAAQMD), the JPB, SamTrans, and participating employers. The Air District and the JPB or SamTrans pay for 75 percent of shuttle costs and participating employers pick up the remaining 25 percent. The following table shows the relative portions of annual funding for BART and Caltrain shuttle buses:

Funding Source	BART Shuttle		Caltrain Shuttle*	
	Percentage	*Dollar Amount*	*Percentage*	*Dollar Amount*
BAAQMD (AB 434 Funds)	50%	$250,000	25%	$500,000
JPB	0%	$0	50%	$1,000,000
SamTrans	25%	$125,000	0%	$0
Employer	25%	$125,000	25%	$500,000
Total	**100%**	**$500,000**	**100%**	**$2,000,000**

*Note: Caltrain shuttle funding is for shuttles in both San Mateo and Santa Clara Counties, this includes a total of 29 shuttles with an average of 4,450 riders per weekday.

The JPB, SamTrans, the Peninsula Congestion Relief Alliance, formerly MTSMA and ITSMA, and some of the larger employers in the County manage shuttle bus programs. The existence of these employers and management agencies is instrumental to the success of employee shuttle bus programs in the County. These shuttle program managers locate qualified shuttle operators, arrange employer consortiums, and set employer rates. Providing these valuable services increases program participation among firms that are unable or unwilling to dedicate staff to coordinating a shuttle bus program.

The marketing of employee shuttle bus programs to employers is indirectly accomplished by city planning agencies and neighboring employers, and directly accomplished by the Peninsula Congestion Relief Alliance. The Alliance markets the benefits of shuttle bus service directly to employers, city chambers of commerce, and SAMCEDA. The Alliance targets existing shuttle programs with low ridership, in order to facilitate the expansion of these programs. The Alliance concentrates its efforts to expand these shuttle programs, because they have found it to be more cost-effective to expand existing shuttle programs than to generate new programs where shuttles do not exist.

Unless a commuter lives and/or works adjacent to a transit stop, a trip to work using transit will have three legs: (1) from home to the transit stop, (2) the transit portion of the trip, and (3) from the transit stop to the work site. Often, commuters prefer to drive for the first leg of the work trip, because fixed-route bus service is infrequent in areas of low density and usually parking is available at transit stops. On the third leg of the work trip, fixed-route bus service is available and is usually timed to meet incoming transit vehicles. This bus service works well, but becomes

inconvenient for commuters that do not work relatively close to the transit stop or have to transfer to another bus. For these commuters, transit becomes an unattractive alternative to driving.

One solution that has made transit attractive and accessible again to commuters in San Mateo County is the use of employee shuttle buses. Employee shuttles have provided the valuable link between mass transit alternatives and the workplace. Shuttles are timed to meet incoming transit vehicles such as BART and Caltrain during peak commute hours. Employees from one or more firms that have contracted the shuttle are then transported directly from the transit stop to the workplace(s). This arrangement makes the third leg of the transit trip quick and convenient.

Employee shuttles also offer significant benefits to participating employers. Participating employers increase their ability to recruit and retain qualified employees from far away communities and positively contribute to worker productivity. In addition, employee shuttles offer greater flexibility at lower costs than fixed-route bus service. Employers can add or delete stops, change the time of the route, change the route of the bus, or change the number of employees on a shuttle, as needs change. Shuttle expense to the supporting agencies and employers is limited to the operating costs of the shuttle provider. Employers only pay for the vehicles that they use for the number of hours that they use them. Employers do not pay the capital cost of the shuttle, the no fault insurance, or the cost of a full-time driver.

Expansion of employee shuttle bus operation is most feasible in areas where major concentrations of employment are located near transit stations. Based on these criteria, the 1990 County Transportation System Management Plan found San Mateo County to be well suited for employee shuttle bus service. The County Plan found that the location pattern of many of the County's major employment centers to be in proximity to a high-density transit corridor.

In addition to employee shuttle programs, hotel shuttles have the potential to reduce traffic congestion. The Peninsula Congestion Relief Alliance is developing a program to consolidate and expand shuttle service between Caltrain stations and San Francisco International Airport and concentrated hotels in Burlingame and Redwood Shores.

The major impediment to an expansion of the existing County shuttle bus programs is the lack of a stable reliable source of funding. Management agencies indicate that the County shuttle bus programs are far from reaching the saturation point, and that their plans to expand the program are not limited by a lack of interest, but rather by a lack of available funds. The current funding mechanisms require annual reapplication to the BAAQMD for AB 434 funds. If the BAAQMD decides not to continue funding shuttles, the other supporting agencies and employers would be forced to make up the difference or discontinue the program. Obtaining a long-term source of guaranteed funding would allow management agencies to expand the use of employee shuttles in the County to better meet the demand. Expansion of the program would increase transit ridership, decrease congestion, and decrease overall vehicle emissions.

b. *Rapidly Removing Accidents*

Policies aimed at improving highway efficiency (i.e., vehicles per lane per hour) by eliminating turbulence are most effective when they are inexpensive and are implemented in cases of extreme congestion. Rapidly removing accidents meets both of these criteria. This can be a very effective TSM technique, perhaps even warranting expensive investment (i.e., helicopters), because accidents and disabled vehicles contribute to about 60 percent of vehicle hours lost to congestion (Moore and Thorsnes, 1994). Rapid accident removal is currently provided by the MTC sponsored Freeway Service Patrol, a network of 50 tow truck drivers patrolling 235 miles of Bay Area freeways, including U.S. 101, Interstate 280 and Highway 92. Expansion of this service would be an effective way of improving traffic conditions in San Mateo County.

c. *Freeway Ramp Metering*

Ramp metering can be an effective TSM tool in cases of severe congestion. When coupled with exclusive HOV lanes that allow HOVs to bypass the wait, it can also be an effective incentive for HOV use.

Several studies have found that metering can increase both speed and volume on roadways experiencing extreme congestion. In San Mateo County, many segments of Highway 101 may be congested enough to

warrant ramp metering at strategic locations. The San Mateo County TSM Plan identifies ramp metering along Highway 101 as having high potential for reducing congestion, although it would increase congestion on local streets. However, it is important to note that when congestion is not sufficiently severe, the time costs of waiting to get on the highway may outweigh the benefits of time saved on the highway.

d. *Signalization*

Traffic signal operation improvements can result in smoother traffic flows by reducing vehicle delays at signalized intersections. This can be accomplished with electronic components that coordinate the timing of consecutive signals and can be augmented by more advanced systems that use road sensors and central traffic control computers. Signal retiming can result in a 15 percent reduction in stops and a comparable reduction in delays (Institute of Transportation Studies, 1983). This technique is most effective on busy arterials with a consecutive series of signalized intersections. If SamTrans implements an El Camino Real "Smart Bus Corridor," signal pre-emption for SamTrans buses may be desirable.

e. *Park and Ride Lots*

Park and ride lots are locations where commuters can park their cars or bicycles free of charge and continue their trip by SamTrans bus or carpool. Park and ride lots have high potential for success because they allow commuters to drive from their home to a transit stop, the portion of their trip that is most difficult for transit to serve.

f. *Reversible Lanes, One-Way Streets, Traffic Channelization*

Reversible lanes are most effective on roadways that experience their heaviest flows in reverse directions during the a.m. and p.m. peak periods. They can be installed using pavement markings, movable barriers, traffic signs, and modification of traffic signals. One-way streets increase roadway capacity by eliminating left turns across traffic, improving signal timing, and improving the efficiency of the roadway. Channelization of

traffic through the use of islands, pavement markings, and traffic signals improves traffic flows and reduces hazards to autos, bicyclists, and pedestrians.

g. Intelligent Transportation Systems (ITS)

The main objective of ITS is to gather and relay information on traffic conditions to traffic managers and individual travelers so that more efficient travel decisions can be made and congestion reduced. ITS includes systems that collect road information using cameras and road sensors and relay it to a traffic control center where traffic flows can be improved by making adjustments to signal patterns. ITS also includes means, such as electronic message boards, of improving the information commuters receive so that they can adjust their routes and timing to avoid extreme congestion.

2. Demand-Side Strategies (Transportation Demand Management)

Most of the policies recommended in the *Countywide Transportation Plan* have as their direct or indirect goal the reduction of single-occupancy vehicle trips, and thus could be viewed as Transportation Demand Management (TDM) measures. However, for the purpose of the CTP, TDM strategies are defined as a package of policies, programs and subsidies implemented by individual firms, several firms within an employment center, or by a developer or residents of a large residential development. The Peninsula Congestion Relief Alliance manages or assists in the implementation and funding of many of these programs. The recommended TDM strategies are presented briefly below.

a. Dedicated Transportation Coordinators

Dedicated transportation coordinators work for companies or an association of companies to promote alternatives to the single-occupant vehicle. They are primarily responsible for disseminating information on commute alternatives, coordinating ridesharing, vanpool and shuttle programs, and providing transit passes. Transportation coordinators also work with transit agencies to improve service to their work sites, as well as with coordinators from other companies. The San Mateo County TSM

Plan identifies transportation coordinators as having high potential for reducing congestion and high applicability to San Mateo County. The Peninsula Congestion Relief Alliance will assist, train and support any interested transportation coordinator in the County.

b. *Ridesharing (Carpools/Vanpools)*

Ridesharing refers to two or more people sharing a carpool or vanpool for a commute trip. It is one of the most effective ways to reduce single-occupant vehicle trips as part of an employer-based TSM program. Ridesharing programs can be facilitated by transportation coordinators or regional ridesharing organizations such as RIDES for Bay Area Commuters, Inc., which provide services that match commuters and assist with the formation of vanpools.

c. *Preferential Parking*

Preferential parking reserves the most desirable parking, such as sheltered parking and parking located closest to building entrances, for HOVs. Preferential parking can be an effective incentive for HOV use when combined with a ridesharing program. It is especially effective at sites with limited parking for employees.

d. *Adjusted Work Schedules and Locations*

Many companies are now experimenting with work schedules and locations in an effort to relieve traffic congestion. A compressed work week, commonly known as a "flex-time" schedule, squeezes the standard 40-hour work week into four days of work, or two weeks and 80 hours of work into nine work days. In addition, more companies are starting telecommute programs, in which employees work at home or a conveniently located "telecommute center," and communicate with work via computer modem, fax, and telephone. Companies should be encouraged to create formal policies that allow telecommuting. As the use of these strategies becomes more widespread, their potential to significantly reduce commute trips will continue to grow.

e. Work Site Design

Another effective form of TDM is to promote the use of alternative transportation modes by influencing work site design at the time of development. Examples of design features that encourage alternatives to the single-occupant vehicle are pedestrian and bicycle paths, bicycle lockers, showers, bus turnouts and shelters, and preferential parking. These strategies and the policies supporting them are presented in the Land Use Policies Section.

f. Parking Cash-Out Programs

Parking cash-out programs can be highly effective at reducing single-occupant vehicle travel by reducing the amount of subsidized parking. They provide commuters with the choice of parking space or its cash value, which the commuter can redeem for less expensive alternative travel modes. Parking cash-out programs and policies are discussed in greater detail in the Pricing Policies Section (Chapter 15).

g. Transit Pass Sales and Subsidies

Employer-based transit pass programs and intra-regional programs like the Echo Pass can encourage employees to ride public transit by increasing the convenience and lowering the cost of obtaining a transit pass. In order to be effective, subsidies must be generous enough to create a significant savings for employees switching from driving alone to riding transit. Support from SAMCEDA to encourage employers to issue transit passes could have a strong effect on expanding these programs.

h. Guaranteed Ride Home Program

Many solo drivers do not use alternative transportation modes because they want to be able to leave work at any time in the event of an emergency (i.e., picking up a sick child from school). Guaranteed ride home programs address this concern by providing "on-call" vehicles to employees with emergency needs. Some programs allow employees to keep a vehicle overnight if necessary. Coordinate with Alliance for

Congestion Relief would have a strong effect on expanding these programs.

C. POLICIES

14.1 Comprehensive Approach

Employ a comprehensive set of transportation system management techniques, including transportation measures, to increase the efficiency of the existing transportation network and reduce single-occupant trips.

14.2 Shuttles

a. Expand Caltrain and BART shuttle bus service to employment sites to meet demand.

b. Develop a stable reliable source of funding for shuttle bus services.

c. Encourage BAAQMD to increase 434 funds for shuttle bus services.

d. Expand and enhance outreach efforts to increase employer participation and financial support in shuttle bus services.

e. Encourage the consolidation of the management of shuttle bus services, including airport-hotel shuttles in areas with clustered hotels.

14.3 Transportation Systems Management Improvements

Support Transportation Systems Management Improvements such as: (1) expanded MTC sponsored Freeway Service Patrol on 101 and 280, (2) ramp metering, (3) synchronized, interconnected traffic signals on major arterials, (4) park and ride lots, (5) reversible lanes, one-way streets, traffic channelization, and (6) intelligent transportation systems.

14.4 Transportation Demand Management

Support programs and projects to reduce the demand for travel by automobile such as: (1) ridesharing (carpools and vanpools), (2) HOV preferential parking, (3) flexible work hours, (4) telecommuting, and (5) transit-oriented development.

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